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GOVERNMENT REPORTS Announcements & Index

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U.S. Department of Commerce
National Technical Information Service

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GOVERNMENT REPORTS
ANNOUNCEMENTS & INDEX

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U.S. DEPARTMENT OF COMMERCE

NATIONAL TECHNICAL INFORMATION SERVICE
Melvin S. Day, Director

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UNITED STATES DEPARTMENT OF COMMERCE
National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161
OFFICE OF THE DIRECTOR

January 4, 1980

Dear GRA&I User:

In response to the requests of GRA&I users, starting with this first 1980 issue of GRA&I and continuing, NASA and DOE citations now include a complete abstract describing the content of the report. Users have also made known that keywords, with the growing availability of online services, no longer continue to have the same value in the printed product as before. Thus, by dropping the keywords for all citations, NTIS has been able to add the NASA and DOE abstracts with little effect on total page count. Further, the various GRA&I indexes remain as complete as ever. Now the user may be able to reduce the number of secondary publications required to maintain full coverage of special areas of scientific and technical interest.

This change in the first 1980 issue is but one of a series of planned innovations for the coming year to improve the quality of NTIS service--in content, appearance, and timeliness. Our new cover suggests other changes yet to come, all designed to improve the overall GRA&I value to you in the most cost-efficient way possible. As other changes occur in response to user needs, we will let you know of them by special announcement in these front pages of GRA&I and in other announcement media.

Sincerely,

MELVIN S. DAY
Director

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GOVERNMENT REPORTS ANNOUNCEMENTS & INDEX

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SPECIAL NOTICE

- NTIS has changed the configuration of PB-prefixed accession numbers. Please refer to page vi.
- Please note the new price-code table on the outside back cover. It reflects new prices effective January 1, 1980.

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FIELD 3. ASTRONOMY AND ASTROPHYSICS. Includes the following Groups: Astronomy; Astrophysics; Celestial Mechanics.

FIELD 4. ATMOSPHERIC SCIENCES. Includes the following Groups: Atmospheric Physics; Meteorology.

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FIELD 7. CHEMISTRY. Includes the following Groups: Chemical Engineering; Inorganic Chemistry; Organic Chemistry; Physical Chemistry, Radio and Radiation Chemistry.

FIELD 8. EARTH SCIENCES AND OCEANOGRAPHY. Includes the following Groups: Biological Oceanography; Cartography; Dynamic Oceanography; Geochemistry; Geodesy; Geography; Geology and Mineralogy; Hydrology and Limnology; Mining Engineering; Physical Oceanography; Seismology; Snow, Ice, and Permafrost; Soil Mechanics; Terrestrial Magnetism.

FIELD 9. ELECTRONICS AND ELECTRICAL ENGINEERING. Includes the following Groups: Components; Computers; Electronic and Electrical Engineering; Information Theory; Subsystems; and Telemetry.

FIELD 10. ENERGY CONVERSION (Non-propulsive). Includes the following Groups: Conversion Techniques; Power Sources; Energy Storage.

FIELD 11. MATERIALS. Includes the following Groups: Adhesives and Seals; Ceramics, Refractories, and Glasses; Coatings, Colorants, and Finishes; Composite Materials; Fibers and Textiles; Metallurgy and Metallography; Miscellaneous Materials; Oils, Lubricants, and Hydraulic Fluids; Plastics; Rubbers; Solvents, Cleaners, and Abrasives; Wood and Paper Products.

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FIELD 14. METHODS AND EQUIPMENT. Includes the following Groups: Cost Effectiveness; Laboratories, Test Facilities, and Test Equipment; Recording Devices; Reliability; Reprography.

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FIELD 16. MISSILE TECHNOLOGY. Includes the following Groups: Missile Launching and Ground Support; Missile Trajectories; Missile Warheads and Fuses; Missiles.

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FIELD 19. ORDNANCE. Includes the following Groups: Ammunition, Explosives, and Pyrotechnics; Bombs; Combat Vehicles; Explosions, Ballistics, and Armor; Fire Control and Bombing Systems; Guns; Rockets; Underwater Ordnance.

FIELD 20. PHYSICS. Includes the following Groups: Acoustics; Crystallography; Electricity and Magnetism; Fluid Mechanics; Masers and Lasers; Optics; Particle Accelerators; Particle Physics; Plasma Physics; Quantum Theory, Solid Mechanics; Solid-state Physics; Thermodynamics; Wave Propagation.

FIELD 21. PROPULSION AND FUELS. Includes the following Groups: Air-breathing Engines; Combustion and Ignition; Electric Propulsion; Fuels; Jet and Gas Turbine Engines; Nuclear Propulsion; Reciprocating Engines; Rocket Motors and Engines; Rocket Propellants.

FIELD 22. SPACE TECHNOLOGY. Includes the following Groups: Astronautics; Spacecraft; Spacecraft Trajectories and Reentry; Spacecraft Launch Vehicles and Ground Support.

*These categories were endorsed by the Committee on Scientific & Technical Information (COSATI) of the Federal Council for Science & Technology in 1964. A booklet describing these categories is available from NTIS; the order number is AD-612 200.

A price schedule, current on date of publication, is affixed to the outside back cover.

SAMPLE ENTRIES

MAIN ENTRY

Report entries are arranged by subject group and field. Within fields they are arranged alphanumerically by NTIS order number (accession number); alphabetic data precedes numeric.

Field 10 ENERGY CONVERSION (NON-PROPULSIVE)

Group 10A Conversion Techniques

Order number — PB-254 315/5GA — PC A16/MF A01 — Price codes

Corporate author — Smithsonian Science Information Exchange, Inc., Washington, D.C.

Report title — **Information on International Research and Development Activities in the Field of Energy,** David F. Hersey. May 76, 370p* NSF/RA-760057, Grant NSF-AER74-20678

Personal author

Keywords — descriptors & identifiers — Descriptors: *Directories, *Indexes (Documentation), *Energy, Research projects, Foreign countries, Bibliographies, Abstracts. Identifiers: Announcement bulletins.

Abstract of report — This directory is the product of a data collection effort undertaken by the Smithsonian Science Information Exchange (SSIE) on behalf of an interagency committee formed under the U.S. State Department to provide international cooperation in energy research and development. Included is information covering 1766 ongoing and recently completed energy research projects conducted in Canada, Italy, the Federal Republic of Germany, France, the Netherlands, the United Kingdom, and 25 other countries. In addition to the title and text of project summaries, the directory contains the following indexes: Subject Index, Investigator Index, Performing Organization Index, and Supporting Organization Index.

INDEX ENTRIES

Index entries are arranged alphanumerically. Titles are included in all indexes except the Contract Number index.

SUBJECT

ENERGY
Information on International Research and Development Activities in the Field of Energy.
PB-254 315/5GI 10A

Entries are sequenced by major subject term (the keywords with an asterisk) and by NTIS order number.

PERSONAL AUTHOR

HERSEY, DAVID F.
Information in International Research and Development Activities in the Field of Energy.
PB-254 315/5GI 10A

Entries are sequenced by personal author, report title, and NTIS order number.

CORPORATE AUTHOR

SMITHSONIAN SCIENCE INFORMATION EXCHANGE, INC., WASHINGTON, D.C.
Information on International Research and Development Activities in the Field of Energy.
(NSF/RA-760057)
PB-254 315/5GI 10A

Entries are sequenced by corporate author name, original report number, and NTIS order number. The monitor agency number is given following the report title.

CONTRACT GRANT NUMBER

NSF-AER74-20678
Smithsonian Science Information Exchange, Inc., Washington, D.C.
PB-254 315/5GI 10A

Entries are sequenced by contract or grant number, corporate author, and NTIS order number.

ACCESSION/REPORT NUMBER

PB-254 315/5GI
Information on International Research and Development Activities in the Field of Energy.
PB-254 315/5GI 10A PC A16/MF A01

Entries are sequenced by NTIS order, original report, or monitor agency number. Price codes are given in this index.

SPECIAL NOTICE

With this issue of *Government Reports Announcements & Index (GRA&I)*, you will note a change in configuration for PB-prefixed accession numbers assigned by NTIS. The new configuration simplifies the numbering of documents. Additional intelligence is incorporated into the number itself. The year of announcement plus identification of Published Searches and subscription items will now be an integral part of the accession number. Published Searches (previously announced as NTIS/PS-xx/xxxx) will be announced in the PB80-8xxxxx number range, and all subscription items will be announced in the PB80-9xxxxx number range. The first two characters of the number—PB—have been retained to provide continuity of the NTIS number series.

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The new configuration applies only to numbers assigned by NTIS. There are no changes in accession or report numbers assigned by other agencies such as NASA, DoE, and DTIC.

REPORTS ANNOUNCEMENTS

1. AERONAUTICS

1A. Aerodynamics

AD-A074 071/2 PC **A04/MF A01**
DCW Industries Inc Studio City CA
Development of an Alternative to the E9 Procedure for Predicting Boundary-Layer Transition.
Final rept. 15 Sep 78-14 Mar 79,
David C. Wilcox. Jun 79, 51p DCW-R-23-01, ONR-CR298-005-2F
Contract N00014-78-C-0799

A method has been devised which can be used in conjunction with linear-stability theory for predicting boundary-layer transition. As with the classical 'eq' procedure, for a given frequency the growth of a disturbance is computed downstream of the initial point of instability using the linearized equations of motion. In contrast to the 'eq' procedure in which the linearized equations are used all the way to the inferred transition point, an approximate set of long-time averaged equations which account for nonlinearity is used to describe the ultimate nonlinear growth of the disturbance. Because the new method accounts for nonlinear processes it holds promise as a more physically sound procedure than the eq method for determining the point at which a boundary layer undergoes transition to turbulence. (Author)

AD-A074 152/0 PC **A05/MF A01**
Aeronautical Research Labs Melbourne (Australia)
Evaluation of Wall Interference Effects in a Two-Dimensional Transonic Wind Tunnel by Subsonic Linear Theory,
B. D. Fairlie, and N. Pollock. Feb 79, 78p Rept no. ARL/AERO-151

Results of transonic wind tunnel tests on two-dimensional aerofoils are analysed with respect to the effects of wind tunnel wall interference. The tests were conducted on two geometrically similar models of each of two aerofoil sections - the NACA 0012 and the BGK-1 sections-and covered a range of Mach numbers from 0.5 to 0.82 with model chord to tunnel height ratios of 0.125 and 0.25. Results from measurements on all models in both solid- and slotted-wall test sections are corrected for wind tunnel wall interference effects by the application of classical linearized theory. For the solid wall results, these corrections appear to produce data which are very close to being free of the effects of interference. In the case of slotted walls however, linear theory is found to significantly underestimate the magnitude of blockage interference. The introduction of an empirical blockage correction, when combined with the linear theory representation of lift-interference, enables the cross-flow characteristics of the slotted walls to be determined, and leads to a successful correction scheme for the slotted wall results. Extensive comparisons with data from other sources, both experimental and theoretical, provide further verification that the corrected results are indeed closely interference free. (Author)

N79-31141/1 PC **A03/MF A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Powered Low-Aspect-Ratio Wing in Ground Effect (Wig) Aerodynamic Characteristics.
J. L. Thomas, J. W. Paulson, Jr., and R. J. Margason. Jul 79, 49p NASA-TM-78793

A wing-in-ground effect configuration was investigated. The configuration used large diameter, low pressure ratio fans mounted about 0.76 wing chord ahead of the wing leading edge to achieve a power augmented ram wing during operation in ground effect. Tests of both in and out of ground effect aerodynamic transition characteristics from very low speeds to cruise speeds are described. The investigation provided a number of conclusions concerning the aerodynamic/propulsive performance interaction. While power augmented lift is required for low speed flight, there is a thrust loss when the efflux is trapped under the wing which reduced the effective thrust to weight available for acceleration by about a third of the installed thrust to weight ratio.

N79-31142/9 PC **A04/MF A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Comparison of Three-Dimensional Panel Methods with Strip Boundary-Layer Simulations to Experiment.
S. O. Kjelgaard, and J. L. Thomas. Jul 79, 51p NASA-TM-80088

Several three dimensional surface panel methods coupled on a streamwise strip basis to two dimensional boundary layer methods were compared to experimental data. Several different boundary layer simulations were investigated. Comparable boundary layer effects which converge to the expected two dimensional result wind increasing aspect ratio were indicated by either a transpiration or camber line displacement simulation. The method was applied to several varied configurations. The lift predictions agreed well with an approximate method based on correcting the inviscid lift using the two dimensional section viscous characteristics. The wing pressures and the effect of the boundary layer on the wing pressures were predicted accurately.

N79-31143/7 PC **A07/MF A01**
Old Dominion Univ., Norfolk, VA.
Subsonic Wind-Tunnel Investigation of Leading-Edge Devices on delta Wings (Data Report).
M. R. Dhanvada, and T. D. Johnson, Jr.. Aug 79, 131p NASA-CR-159120
Contract NGR-47-003-052

The drag reduction potential of leading edge devices on delta wings at high lift is presented. Fences, pylon type vortex generators, chordwise slots, and sharp plate extensions were tested on wing models with 60 and 74 degree swept blunt leading edges at angles of attack to 32 degrees. Six component balance and leading edge surface pressure measurements were taken with various geometry and spanwise arrangements of the devices. Tables listing the data, without analysis, are presented.

N79-31144/5 PC **A05/MF A01**
Boeing Commercial Airplane Co., Seattle, WA.
Dynamic Loads Analysis System (DYLOFLEX) Summary. Volume 1: Engineering Formulation.
R. D. Miller, R. I. Kroll, and R. E. Clemmons. Sep 79, 88p NASA-CR-2846-1, D6-44455-V-1
Contract NAS1-13918
Seri-2.

The DYLOFLEX computer program system expands the aeroelastic cycle from that in the FLEXSTAB computer program system to include dynamic loads analyses involving active controls. Two aerodynamic options exist within DYLOFLEX. The analyst can formulate the problem with unsteady aerodynamics calculated using the doublet lattice method or with quasi-steady aerodynamics formulated from either FLEXSTAB or doublet lattice steady state aerodynamics with unsteady effects approximated by indicial lift growth functions. The equations of motion are formulated assuming straight and level flight and small motions. Loads are calculated using the force summation technique. DYLOFLEX consists of nine standalone programs which can be linked with each other by magnetic files used to transmit the required data between programs.

N79-31145/2 PC **A04/MF A01**
Boeing Commercial Airplane Co., Seattle, WA.
Dynamic Loads Analysis System (DYLOFLEX) Summary. Volume 2: Supplemental System Design Information.
R. D. Miller, R. I. Kroll, and R. E. Clemmons. Sep 79, 60p NASA-CR-2846-2, D6-44455-V-2
Contract NAS1-13918
Seri-2.

Contents: execution of the DYLOFLEX program system; magnetic file format; DYLIB - the DYLOFLEX alternate subroutine library; and prefaces for DYLIB subroutines.

N79-31147/8 PC **A04/MF A01**
Boeing Commercial Airplane Co., Seattle, WA.
Modal Interpolation Program, L215(INTERP). Volume 2: Supplemental System Design and Maintenance Document.
M. Y. Hirayama, and R. I. Kroll. Sep 79, 69p NASA-CR-2848, D6-44457
Contract NAS1-13918

The design, structure, and usage of the modal interpolation program L215 are presented. The program uses modal data sets of arrays containing interpolation coefficients. The interpolation arrays are used to determine displacements at various aerodynamic control points. The displacements consist of translations normal to the aerodynamic surface and surface slopes that are parallel and perpendicular to the free stream direction. Five different interpolation methods are available.

N79-31148/6 PC **A04/MF A01**
Boeing Commercial Airplane Co., Seattle, WA.
A Program to Compute Three-Dimensional Subsonic Unsteady Aerodynamic Characteristics Using the Doublet Lattice Method, L216 (DUBFLEX). Volume 2: Supplemental System Design and Maintenance Document.
Topical Report, May 1975 - May 1977.
B. A. Harrison, and M. Richard. Sep 79, 75p NASA-CR-2850, D6-44459
Contract NAS1-13918
Seri-2.

The information necessary for execution of the digital computer program L216 on the CDC 6600 is described. L216 characteristics are based on the doublet lattice method. Arbitrary aerodynamic configurations may be represented with combinations of nonplanar lifting surfaces composed of finite constant pressure panel elements, and axially summetric slender bodies composed of constant pressure line elements. Program input consists of configuration geometry, aerodynamic parameters, and modal data; output includes element geometry, pressure difference distributions, integrated aerodynamic coefficients, stability derivatives, generalized aerodynamic forces, and aerodynamic influence coefficient matrices. Optionally, modal data may be input on magnetic field (tape or disk), and certain geometric and aerodynamic output may be saved for subsequent use.

N79-31149/4 PC **A06/MF A01**
Bihrle Applied Research, Inc., Jericho, NY.
Rotary Balance Data for a Typical Single-Engine General Aviation Design for an Angle-of-Attack Range of 8 Deg to 90 Deg. 2: High-Wing Model A.
W. Mulcay, and R. Rose. Sep 79, 116p NASA-CR-3101
Contract NAS1-14849

Aerodynamic characteristics obtained in a rotational flow environment utilizing a rotary balance located in the Langley spin tunnel are presented in plotted form for a 1/5-scale, single-engine, high-wing, general aviation airplane model. The configurations tested included various tail designs and fuselage shapes. Data are presented without analysis for an angle of attack range of 8 to 90 degrees and clockwise and counter-clockwise rotations covering an Omega b/2 v range from 0 to 0.85.

N79-31150/2 PC **A06/MF A01**
Lockheed Missiles and Space Co. Inc., Palo Alto, CA.
Numerical Method for Predicting Flow Characteristics and Performance of Nonaxisymmetric Nozzles, Theory.
P. D. Thomas. Sep 79, 109p NASA-CR-3147, LMSC-D633457
Contract NAS1-15084

The theoretical foundation and formulation of a numerical method for predicting the viscous flowfield in and about isolated three dimensional nozzles of geometrically complex configuration are presented. High Reynolds number turbulent flows are of primary interest for any combination of subsonic, transonic, and supersonic flow conditions inside or outside the nozzle. An alternating-direction implicit (ADI) numerical technique is employed to integrate the unsteady Navier-Stokes equations until an asymptotic steady-state solution is reached. Boundary conditions are computed with an implicit technique compatible with the ADI technique employed at interior points of the flow region. The equations are formulated and solved in a boundary-conforming curvilinear coordinate system. The curvilinear coordinate system and computational grid is generated numerically as the solution to an elliptic boundary value problem. A method is developed

that automatically adjusts the elliptic system so that the interior grid spacing is controlled directly by the a priori selection of the grid spacing on the boundaries of the flow region.

N79-31151/0 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Wind-Tunnel Investigation of an Armed Mini Remotely Piloted Vehicle.
A. E. Phelps, Iii. Sep 79, 62p NASA-TM-80132, L-13026
Subm-Prepared in Cooperation with Army Aviation Research and Development Command, St. Louis, Mo.

A wind tunnel investigation of a full scale remotely piloted vehicle (RPV) armed with rocket launchers was conducted. The model had unacceptable longitudinal stability characteristics at negative angles of attack in the original design configuration. The addition of a pair of fins mounted in a V arrangement on the propeller shroud resulted in a configuration with acceptable longitudinal stability characteristics. The addition of wing mounted external stores to the modified configuration resulted in a slight reduction in the longitudinal stability. The lateral directional characteristics of the model were generally good, but the model had low directional stability at low angles of attack. Aerodynamic control power was very strong around all three axes.

N79-31152/8 PC **A15**/MF **A01**
Bihrle Applied Research, Inc., Jericho, NY.
Rotary Balance Data for a Single-Engine Trainer Design for an Angle-of-Attack Range of 8 Deg to 90 Deg.
P. Pantason, and W. Dickens. Aug 79, 327p NASA-CR-3099
Contract NAS1-14849

Aerodynamic characteristics obtained in a rotational flow environment utilizing a rotary balance located in the Langley spin tunnel are presented in plotted form for a 1/6 scale, single engine trainer airplane model. The configurations tested included the basic airplane, various wing leading edge devices, elevator, aileron and rudder control settings as well as airplane components. Data are presented without analysis for an angle of attack range of 8 to 90 degrees and clockwise and counter-clockwise rotations.

N79-31154/4 PC **A03**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
Time History Solution Program, L225 (TEV126). Volume 2: Supplemental System Design and Maintenance Document.
Topical Report, May 1975 - May 1977.
A. Tornallyay, R. E. Clemmons, and R. I. Kroll. Sep 79, 34p NASA-CR-2860, D6-44469-V-2
Contract NAS1-13918

The time history solution program L225 (TEV126) is described. The program calculates the time responses of a linear system by convoluting the impulsive response functions with the time dependent excitation. The convolution is performed as a multiplication in the frequency domain. Fast Fourier transform techniques are used to transform the product back into the time domain to obtain response time histories. The design and structure of the program is presented.

N79-31155/1 PC **A05**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
A Program for Calculating Load Coefficient Matrices Utilizing the Force Summation Method, L218 (LOADS). Volume 2: Supplemental System Design and Maintenance Document.
Topical Report, May 1975 - May 1977.
L. R. Anderson, and R. D. Miller. Sep 79, 94p NASA-CR-2854, D6-44463-V-2
Contract NAS1-13918

The LOADS computer program L218, which calculates dynamic load coefficient matrices utilizing the force summation method, is described. The load equations are derived for a flight vehicle in straight and level flight and excited by gusts and/or control motions. In addition, sensor equations are calculated for use with an active control system. The load coefficient matrices are calculated for the following types of loads: (1) translational and rotational accelerations, velocities, and displacements; (2) panel aerodynamic forces; (3) net panel forces; and (4) shears, bending moments, and torsions.

N79-31195/7 PC **A05**/MF **A01**
Lockheed-Georgia Co., Marietta.
Correlation of Data Related to Shock-Induced Trailing-Edge Separation and Extrapolation to Flight Reynolds Number.
J. F. Cahill, and P. C. Connor. Sep 79, 82p NASA-CR-3178
Contract NAS2-9331

Pressure data from a number of previous wind tunnel and flight investigations of high speed transport type wings were analyzed with the intent of developing a procedure for extrapolating low Reynolds number data to flight conditions. These analyses produced a correlation of the development of trailing-edge separation resulting from increases in Mach number and/or angle of attack and show that scale effects on this correlated separation development and the resulting shock location changes fall into a regular and apparently universal pattern. Further studies appear warranted to refine the correlation through a detailed consideration of boundary layer characteristics, and to evaluate scale effects on supercritical wings.

N79-31529/7 PC **A04**/MF **A01**
Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
Turbulent Boundary Layers. Part 2: Calculation of Boundary Layer Development Using the Turbulent Energy Equation.
P. Bradshaw. Mar 68, 73p VKI-LECTURE-Ser-5-PT-2
Seri-3. Conf-Lecture Held at Rhode-Saint-Genese, Belgium, 4-15 Mar. 1968.

Details are given of one of a family of prediction methods, based on the hypothesis that the relations between the turbulent shear stress and the other properties of the turbulence are sufficiently universal to be represented for engineering purposes by functions of only a few parameters. It is suggested that this hypothesis is a better approximate than the hypothesis of universal relations between the turbulent shear stress and the mean velocity profile. Mixing length theory is shown to be a special cased of the prediction method described.

N79-31530/5 PC **A09**/MF **A01**
Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
Mechanics of Boundary Layer Transition, Part 2: Instability and Transition to Turbulence.
M. V. Morkovin. Feb 68, 176p VKI-LECTURE-Ser-3-PT-2
Seri-3. Conf-Lecture Held at Rhode-Saint-Genese, Belgium.

No abstract available.

N79-31532/1 PC **A05**/MF **A01**
Von Karman Inst. for Fluid Dynamics, Rhode-Saint-Genese (Belgium).
Mechanics of Boundary Layer Transition, Part 3: Instability and Transition to Turbulence (Outline of Concepts).
M. V. Morkovin. Feb 68, 94p VKI-LECTURE-Ser-3-PT-3
Seri-3. Conf-Lecture Held at Rhode-Saint-Genese, Belgium.

Concepts on instability and transition from laminar to turbulent shear layers are outlined. The concepts include low speed pressure gradients, obtaining transition information from hypersonic flight tests and ballistic ranges, wakes, unsteady boundary layers, three dimensional boundary layers, surface roughness, transition reversals with cooling, and free stream turbulence correlation.

1B. Aeronautics

AD-A073 844/3 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
The Aeroflot Unknown Services.
1 Feb 79, 7p Rept no. FTD-ID(RS)T-2370-78
Edited trans. of Skrzydlata Polska (Poland) n4 p5 1978, by Ilia Kimmelfeld.

No abstract available.

1C. Aircraft

AD-A073 843/5 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
The Latest Soviet Transportation Aircraft.
J. Grzegorzewski. 23 Feb 79, 21p Rept no. FTD-ID(RS)T-2366-78
Edited trans. of Mlody Technik (Poland) v27 n10 p36-44 1977.

No abstract available.

AD-A073 847/6 PC **A04**/MF **A01**
Douglas Aircraft Co Inc Santa Monica CA
The Characteristics of Fuel Motion which Affect Airplane Dynamics.
E. W. Graham, and A. M. Rodriquez. 27 Nov 51, 55p Rept no. DAC-SM-14212

Problems in aircraft dynamics such as stability and response of the rigid airplane may be affected by fuel motion in the tanks. Such problems might also arise in connection with missiles. In this report the response of the fuel to simple harmonic motions of a rectangular tank in translation, pitching and yawing is studied. The shape of the free surface and the values of forces and moments are obtained. Using the force and moment expressions, simple mechanical systems equivalent to the fuel are constructed. These systems respond to motions of the tank walls in the same fashion as the fuel, producing identical forces and moments. With the aid of this mechanical analogy the complete dynamic system can be handled by any desired process.

AD-A074 049/8 PC **A03**/MF **A01**
Army Test and Evaluation Command Aberdeen Proving Ground MD
Climatic Chamber Testing (Aircraft, Engines Armament and Avionics). Test Operations Procedure.
Final rept.
31 Aug 79, 35p Rept no. TOP-7-3-521
Supersedes Rept. no. MTP -7-3-521, AD-733 299.

This document provides information, guidance and methodology for planning and conducting an environmental climatic chamber developmental test of aviation materiel. Environmental climatic chamber developmental testing in general, determines the degree to which aviation materiel meets the developmental requirements of the US Army Materiel Needs (MN) documents, when subjected to the environmental conditions developed in the climatic chamber. (Author)

AD-A074 070/4 PC **A05**/MF **A01**
Computational Mechanics Consultants Inc Knoxville TN
A Numerical Viscous-Inviscid Interaction Algorithm for Prediction of Near-Field VSTOL Jet-Induced Flowfields.
Final rept. Oct 77-Sep 78,
A. J. Baker, and P. D. Manhardt. Feb 79, 82p NADC-77167-30
Contract N62269-77-C-0491

A turbulent-inviscid numberical interaction algorithm is derived and evaluated for detailed determination of the near-field flow of a jet injected perpendicular to a crosswind. The two distinct solution domains are pressure coupled through a Poisson equation solution, and entrainment-induced mass flux is an iteration variable. Finite element procedures are employed for solution of the resulting non-linear initial-boundary value equations. Key results are discussed documenting viability for analysis of a round-jet at a velocity ratio equal to eight. (Author)

AD-A074 092/8 PC **A05**/MF **A01**
Calspan Advanced Technology Center Buffalo NY
Design Criteria for Optimal Flight Control Systems.
Final rept. Jan-Nov 78,
K. S. Govindaraj, E. G. Rynaski, and A. T. Fam. 7 Sep 79, 95p CALSPAN-6248-F-1, ONR-CR215-259-1F
Contract N00014-78-C-0155
Prepared in cooperation with the State Univ. of New York at Buffalo. Dept. of Systems Engineering.

Discussed is the application of linear optimal control to the design of a multicontroller feedback system to satisfy aircraft flying qualities criteria. The problem addressed is that of relating the performance index weighting matrices to the poles and zeros of the closed-loop transfer functions. Two sequential design procedures, one computing the Riccati solution from a set of linear equations and the other computing the closed-loop eigenvectors, are presented that determine, at each step, the pole-zero movements of the closed-loop transfer functions as the weighting matrix on the states is varied for a given weighting matrix on the controls. The performance index matrix constructed at each step to move the poles and zeros is added to get a final performance index matrix that moves the open-loop poles and zeros to more desirable locations. A control system design example with the X-22A V/STOL aircraft as the model, and using the first sequential design procedures, is presented. Two alternative design techniques are also presented. The first is based upon the Riccati equation solution and the control weighting matrix rather than on the weighting matrices on the states and control, and in the second design technique, the change in the pole-zero locations is determined under perturbations in the performance index matrices.

AD-A074 128/0 PC **A02**/MF **A01**
Army Test and Evaluation Command Aberdeen Proving Ground MD
Aircraft Anti-Icing/De-Icing.
Final rept. on test operating procedure.
31 Aug 79, 21p Rept no. TOP-7-3-528
Supersedes report dated 24 Mar 71, AD-724 082.

This document provides information, methodology and techniques necessary to plan, conduct and document a development test of an aircraft anti/icing/de-icing system. A development test of an aircraft anti-icing/de-icing system will determine the degree to which a subject system and its associated documentation, tools and auxiliary equipment meets the requirements of the Army Materiel Needs documents. (Author)

AD-A074 141/3 PC **A08**/MF **A01**
Bell Helicopter Textron Fort Worth TX
Analysis of Low-Speed Helicopter Flight Test Data.
Final rept. Mar 77-Mar 79,
James L. Tangler. Aug 79, 154p BHT-699-099-103, USARTL-TR-79 19
Contract DAAJ02-77-C-0022

The purpose of this study was to investigate the aerodynamic behavior of a helicopter rotor operating in the low-speed flight regime, particularly in the nap-of-the-earth (NOE) evasive mode. The effort consisted of reducing and analyzing existing AH-1G flight test response data acquired for simulated NOE flight under Contract DAAJ02-73-C-0105. Specific areas of interest analyzed in this study include blade/vortex interaction at 50 knots and angle-of-attack data derived from hot-wire measurements taken in hover.

AD-A074 154/6 PC **A03**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Prediction of Helicopter Rotor Downwash in Hover and Vertical Flight.
Aerodynamics rept.,
K. R. Reddy. Jan 79, 36p Rept no. ARL-AERO-150

A method is presented for the calculation of rotor downwash in hovering and vertical flight. The blade is represented by a lifting line. The rotor wake is simulated by a vortex sheet and a series of rolled-up root and tip vortices, similar in form to that of a classical fixed-wing. The concept of rectangularization of the rotor wake is used in obtaining a formula for the normal component of induced velocity. Wake contraction based on experimental data is introduced into the calculations. Numerical calculations have been performed for two rotor configurations, viz. S.58, and a model rotor. Computed induced velocities and blade loadings are compared with the available flight data. The comparison shows the present simple method yields satisfactory results. (Author)

AD-A074 155/3 PC **A02**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Generation of a Representative Load Sequence for the Fatigue Testing of Macchi MB 326H Spar Booms.
Structures note,
L. R. Gratzer. Jan 79, 25p Rept no. ARL-STRUC NOTE-450

Testing techniques have been developed to allow more realistic load sequences. To take advantage of this, the design of such test sequences must also be improved and for several years large scale tests at ARL have relied on loads obtained from flight histories transformed as little as possible. In this way the probability structure of flight sequences can be restored. Until now however, the design of test histories has been almost entirely manual. This note describes the generation of histories by use of automatic data processing techniques and linear programming. The example used in this note is the Macchi centre section spar boom which is being tested under the design load history to supplement earlier data obtained under less realistic load sequences. (Author)

AD-A074 201/5 PC **A06**/MF **A01**
Aeronautical Research Labs Melbourne (Australia)
Resonance Test on Nomad N22 Fitted with External Stores.
Structures note,
G. Long, and C. M. Bailey. Jan 78, 114p Rept no. ARL-STRUC-NOTE-449

A resonance test on the N22 Nomad, fitted with extenal stores, has been conducted. The natural modes and frequencies of vibration have been measured for two store configurations, in the frequency range up to 30 hertz. (Author)

AD-A074 245/2 PC **A02**/MF **A01**
Virginia Univ Charlottesville Dept of Chemistry
New Laser Dye Systems Based on Luminescent Transition Metal Complexes.
Annual rept. 1 Jun 78-31 May 79,
James N. Demas. 30 Jul 79, 8p AFOSR-TR-79-0983
Grant AFOSR-78-3590

Excited state interactions of luminescent ruthenium (II) complexes with laser dyes are being studied. Novel experimental tools including an ultra high accuracy quantum counter comparator, a microcomputer controlled nanosecond risetime boxcar integrator, a luminescent wavelength shifter method for correcting for the wavelength dependence of phototube transit times in decay time measurements, and a step excitation method for studying reversible excited state electron transfer have been developed to facilitate these studies. Energy transfer from the tris(2,2'-bipyridine)-ruthenium(II) complex to a variety of rhodamine and oxazine laser dyes have been demonstrated in both homogeneous solutions and in micellar assisted ones. In favorable cases energy transfer efficiencies from the charge transfer (CT) sensitizing state of the Ru(II) complex to the singlet state of the laser dyes exceed 80%. To date energy transfer appears to be dominantly by a Forster resonance mechanism. In the micellar cases the dye and complex are brought so closely together that contact quenching of the excited dye singlet state can occur. Applications of these systems to new binary laser dyes are under study. (Author)

AD-A074 260/1 PC **A04**/MF **A01**
Martin Marietta Labs Baltimore MD
Separation Jump and Sudden Stall Over an Ellipsoidal Wing at Incidence.
Technical rept.,
K. C. Wang. May 79, 51p MML-TR-79-22C, AFOSR-TR-79-0965
Contract F49620-76-C-0004

To obtain complete and rigorous solutions of the three-dimensional, laminar boundary layer over a finite airplanewing, a flat ellipsoid was chosen as a model to generate concrete results. Initial efforts were directed toward calculating the inviscid flow and the selection of coordinate system, and this was followed by a detailed investigation of the boundary layer restricted to the symmetry-plane. This investigation showed that as the incidence increases, the separation point on the upper surface does not always move continuously forward; instead, it first moves forward and later rearward. Then, at a critical incidence, it jumps forward and moves thereafter close to the leading edge. This 'separation jump' phenomenon was further found to be little affected by varying the span, but critically dependent on the chord: a longer chord prompts a larger jump. Although such separation jump has been reported for a body of revolution, it has not yet been reported for wing surfaces. The significance of this phenomenon is apparent when one considers that the separation jump may well occur on airplane wings in general and probably accounts for what we might call 'sudden stall'. (Author)

AD-A074 261/9 PC **A05**/MF **A01**
Kaman Avidyne Burlington MA
An Evaluation of the ADINA Finite Element Program for Application to Aircraft Overpressure Vulnerability.
Final rept. 12 Nov 77-31 Oct 78,
Thomas R. Stagliano, and Lawrence J. Mente. Feb 79, 81p KA-TR-162, DNA-4876F, AD-E300 579
Contract DNA001-78-C-0057

In aircraft overpressure vulnerability, stiffened thin-walled panel configurations are subjected to surface pressure loadings of varying time histories. These dynamic loads subject the impinged structural components to large deflections and an elastic-plastic material response. The ability to predict accurately the deflection and strain time histories of complex aircraft structures of arbitrary geometry has become of increasing importance. The ADINA (Automatic Dynamic Incremental Nonlinear Analysis) computer code is evaluated to determine if it is a numerically accurate, computationally efficient means of analyzing these complex structures under transient pressure loading. In this initial evaluation, the ADINA solutions for clamped beams, simply supported, and clamped flat unstiffened panels and flat stiffened panels subjected to transient pressure loadings are compared with solutions from other nonlinear structural codes. ADINA was found to be an efficient and accurate computer code which provides the full nonlinear capability required for aircraft vulnerability analysis. Shortly, a new version of ADINA will be available that contains a desirable thin shell element. However, ADINA finite elements would still have to be extended to include various shaped stringer and frame cross sections and multilayered skin configurations associated with aircraft structures.

ESDU-69023-A-B-C PC**$578.50**
Engineering Sciences Data Unit Ltd., London (England).
Average Gust Frequencies Subsonic Transport Aircraft.
Data item.
c1979, 43p ISBN-0-85679-259-4
Supersedes ESDU-69023.
For information on availability of series, sub-series, and other individual data items, write NTIS, Attn: ESDU, Springfield, VA. 22161.

The report provides data for compilation of the cumulative frequency gust spectrum experienced by an aircraft structure. It presents an estimation of fatigue loading encountered by aircraft wing structures in flight. (Copyright (c) Engineering Sciences Data Unit Ltd, 1979.)

N79-31136/1 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
A Comparison of Predictions Obtained from Wind Tunnel Tests and the Results from Cruising Flight: Airbus and Concorde.
J. Berger. Aug 79, 71p NASA-TM-75238, AGARD-CP-242
Contract NASW-3199
Tran-Transl. Into English of "Comparison Entre les Resultats de Vol en Croisiere: Airbus et Concorde", AGARD-Cp-242, Rept-20. Misc-Original Language Document Was Announced as N78-26074. Subm-Trans. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By Aerospatiale (France). Conf-Presented at Flight Mechanics Panel Specialists Meeting on Performance Prediction Methods, Paris.

Following a summary of the methods used to establish aerodynamic data and propulsion data, a comparison was made in the form of the drag (or thrust) difference between flight results and pre-

dictions made on the basis of these data. Certain hypothesis and improvements on aerodynamic data were presented in order to explain the slight deficit found on Airbus and Concorde.

N79-31137/9 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
The Promise of Multicyclic Control.
J. L. Mccloud, Iii. Aug 79, 36p NASA-TM-78621, A-7955

Several types of rotors which employ multicyclic control are reviewed and compared. Their differences are high-lighted and their potential advantages and disadvantages are discussed. The flow field these rotors must operate in is discussed, and it is shown that simultaneous elimination of vibration and oscillatory blade loads is not an inherent solution to the roughness problem. The use of rotor blades as energy absorbers is proposed. Input-output relations are considered and a gain control for ROMULAN, a multicyclic controlling computer program, is introduced. Implications of the introduction of multicyclic systems into helicopters are discussed.

N79-31163/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Supersonic Transport Vis-a-Vis Energy Savings.
G. Cormery. Sep 79, 27p NASA-TM-75464
Contract NASW-3199
Tran-Transl. Into English from Aeron. Astronaut (Paris), Vol. 69, No. 2, 1978 p 3-14. Misc-Original Language Document Was Announced as A78-35893. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif.

The energy and economic saving modifications in supersonic transportation are studied. Modifications in the propulsion systems and in the aerodynamic configurations of the Concorde aircraft to reduce noise generation and increase fuel efficiency are discussed. The conversion of supersonic aircraft from fuel oils to synthetic fuels is examined.

N79-31164/3 PC **A06**/MF **A01**
Boeing Vertol Co., Philadelphia, PA.
Development of Crashworthy Passenger Seats for General-Aviation Aircraft.
M. J. Reilly, and A. E. Tanner. Aug 79, 112p
NASA-CR-159100, D210-11336-1
Contract NAS1-14637

Two types of energy absorbing passenger seat concepts suitable for installation in light twin-engine fixed wing aircraft were developed. An existing passenger seat for such an aircraft was used to obtain the envelope constraints. Ceiling suspended and floor supported seat concept designs were developed. A restraint system suitable for both concepts was designed. Energy absorbing hardware for both concepts was fabricated and tension and compression tests were conducted to demonstrate the stroking capability and the force deflection characteristics. Crash impact analysis was made and seat loads developed. The basic seat structures were analyzed to determine the adequacy of their strength under impact loading.

N79-31166/8 PC **A13**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Conference on Fire Resistant Materials: A Compilation of Presentations and Papers.
D. A. Kourtides, and G. A. Johnson. Jul 79, 287p NASA-CP-2094, A-7894
Conf-Conf. Held in Seattle, 1-2 Mar. 1979.

No abstract available.

N79-31192/4 PC **A04**/MF **A01**
Lockheed-California Co., Burbank.
Testing and Analysis of Dual-Mode Adaptive Landing Gear, Taxi Mode Test System for YF-12A.
M. A. Gamon. Sep 79, 54p NASA-CR-144884, LR-28776
Subm-Sponsored by NASA.

The effectiveness of a dual mode adaptive landing gear system in reducing the dynamic response of an airplane during ground taxiing was studied. The dynamic taxi tests of the YF-12A research airplane are presented. A digital computer program which simulated the test conditions is discussed. The dual mode system as tested provides dynamic taxi response reductions of 25 percent at the cg and 30 to 45 percent at the cockpit.

N79-31193/2 PC **A04**/MF **A01**
Rockwell International Corp., Los Angeles, CA. Aircraft Div.
Ride Qualities Criteria Validation/Pilot Performance Study: Flight Test Results.
Final Report.
L. U. Nardi, H. Y. Kawana, and D. C. Greek. Sep 79, 69p NASA-CR-144885, NA-78-897
Contract NAS4-2542

Pilot performance during a terrain following flight was studied for ride quality criteria validation. Data from manual and automatic terrain following operations conducted during low level penetrations were analyzed to determine the effect of ride qualities on crew performance. The conditions analyzed included varying levels of turbulence, terrain roughness, and mission duration with a ride smoothing system on and off. Limited validation of the B-1 ride quality criteria and some of the first order interactions between ride qualities and pilot/vehicle performance are highlighted. An earlier B-1 flight simulation program correlated well with the flight test results.

N79-31220/3 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, CA.
Analysis of a Lateral Pilot-Induced Oscillation Experienced on the First Flight of the YF-16 Aircraft.
J. W. Smith. Sep 79, 53p NASA-TM-72867

In order to compare and assess potential improvements, two control systems were modeled; the original first flight or prototype aircraft system, and a modification of the prototype system, which essentially reduced the overall gain for the takeoff and landing phase. In general, the overall system gain reduction of the modified flight control system was sufficient to avoid lateral pilot-induced oscillation tendencies. Lowering the system gain reduced the tendency to rate saturate, which resulted in correspondingly higher critical pilot gains for the same control input.

N79-31221/1 PC **A08**/MF **A01**
Honeywell Systems and Research Center, Minneapolis, MN.
Helicopter High Grain Control.
Final Report.
T. B. Cunningham, and E. C. Nunn. Jul 79, 171p NASA-CR-159052, HONEYWELL-79SRC33
Contract NAS1-14789

High gain control is explored through a design study of the CH-47B helicopter. The plans are designed to obtain the maximum bandwidth possible given the hardware constraints. Controls are designed with modal control theory to specific bandwidths and closed loop mode shapes. Comparisons are made to an earlier complementary filter approach. Bandwidth improvement by removal of limitations is explored in order to establish hardware and mechanization options. Improvements in the pitch axis control system and in the rate gyro sensor noise characteristics in all axes are discussed. The use of rotor state feedback is assessed.

N79-31222/9 PC **A09**/MF **A01**
Systems Technology, Inc., Mountain View, CA.
A Compilation and Analysis of Helicopter Handling Qualities Data. Volume 2: Data Analysis.
R. K. Heffley. Aug 79, 176p NASA-CR-3145, TR-1087-2-V-2
Contract NAS2-9344

A compilation and an analysis of helicopter handling qualities data are presented. Multiloop manual control methods are used to analyze the descriptive data, stability derivatives, and transfer functions for a six degrees of freedom, quasi static model. A compensatory loop structure is applied to coupled longitudinal, lateral and directional equations in such a way that key handling qualities features are examined directly.

N79-31354/0 PC **A13**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
Development of Aircraft Lavatory Compartments with Improved Fire Resistance Characteristics. Phase 2: Sandwich Panel Resin System Development.
Final Report.
R. A. Anderson, D. B. Arnold, and G. A. Johnson. 1979, 284p NASA-CR-152120, D6-46839
Contract NAS2-8700

A NASA-funded program is described which aims to develop a resin system for use in the construction of lavatory wall panels, sidewall panels, and ceiling panels possessing flammability, smoke and gas emission, and toxicity (FS&T) characteristics superior to the existing epoxy resin. Candidate resins studied were phenolic, polyimide, and bismaleimide. Based on the results of a series of FS&T as well as mechanical and aesthetic property tests, a phenolic resin was chosen as the superior material. Material and process specifications covering the phenolic resin based materials were prepared and a method of rating sandwich panel performance was developed.

N79-31628/7 PC **A08**/MF **A01**
Rockwell International Corp., Downey, CA.
Actively Cooled Plate Fin Sandwich Structural Panels for Hypersonic Aircraft.
Final Report.
L. M. Smith, and C. S. Beuyukian. Aug 79, 172p NASA-CR-3159, SD-78-AP-0074
Contract NAS1-13382

An unshielded actively cooled structural panel was designed for application to a hypersonic aircraft. The design was an all aluminum stringer-stiffened platefin sandwich structure which used a 60/40 mixture of ethylene glycol/water as the coolant. Eight small test specimens of the basic platefin sandwich concept and three fatigue specimens from critical areas of the panel design was fabricated and tested (at room temperature). A test panel representative of all features of the panel design was fabricated and tested to determine the combined thermal/mechanical performance and structural integrity of the system. The overall findings are that; (1) the stringer-stiffened platefin sandwich actively cooling concept results in a low mass design that is an excellent contender for application to a hypersonic vehicle, and (2) the fabrication processes are state of the art but new or modified facilities are required to support full scale panel fabrication.

N79-32051/1 PC **A07**/MF **A01**
Bolt, Beranek, and Newman, Inc., Canoga Park, CA.
Evaluation of AERO Commander Propeller Acoustic Data: Taxi Operations.
A. G. Piersol, E. G. Wilby, and J. F. Wilby. Jun 79, 130p NASA-CR-159124
Contract NAS1-14611

The acoustic data from ground tests performed on an Aero Commander propeller driven aircraft are analyzed. An array of microphones flush mounted on the side of the fuselage were used to record data. The propeller blade passage noise during operations at several different taxi speeds is considered and calculations of the magnitude and phase of the blade passage tones, the amplitude stability of the tones, and the spatial phase and coherence of the tones are included. The measured results are compared to theoretical predictions for propeller noise and various evaluations which reveal important details of propeller noise characteristics are presented.

N79-32052/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
An Experimental Investigation of Trailing-Edge Noise.
T. F. Brooks, and T. H. Hodgson. Jun 79, 9p NASA-TM-80134

Airfoil trailing-edge noise up to a Reynolds number based on chord of 2.96 x 10 to the 6th power was studied. Comparisons are made with current

theory, particularly with regard to the nature of the pressure field in the vicinity of the trailing-edge and its influence on the radiated noise.

N79-32054/5 PC **A05**/MF **A01**
Boeing Vertol Co., Philadelphia, PA.
Study of Design Constraints on Helicopter Noise.
H. Sternfeld, Jr., and C. W. Wiedersum. Jul 79, 91p NASA-CR-159118
Contract NAS1-15226

A means of estimating the noise generated by a helicopter main rotor using information which is generally available during the preliminary design phase of aircraft development is presented. The method utilizes design charts and tables which do not require an understanding of acoustical theory or computational procedures in order to predict the perceived noise level, a weighted sound pressure level, or C weighted sound pressure level of a single hovering rotor. A method for estimating the effective perceived noise level in forward flight is also included. In order to give the designer an assessment of the relative rotor performance, which may be traded off against noise, an additional chart for estimating the percent of available rotor thrust which must be expended in lifting the rotor and drive system, is included as well as approach for comparing the subjective acceptability of various rotors once the absolute sound pressure levels are predicted.

PATENT-4 150 920 Not available NTIS
Department of the Army Washington DC
Rotor Blade Tipweight Assembly.
Patent,
Raymond P. Belko, and Robert C. Huss. Filed 2 Dec 77, patented 24 Apr 79, 5p AD-D006 360/2, PAT-APPL-856 715
Supersedes PAT-APPL-856 715-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Helicopter rotor blades require tip weights for spanwise and chordwide balance to assure that all of the blades rotate in the same track. The improved rotor blade tip weight assembly of the present invention comprises an elongated spar, preferably formed of a reinforced plastic, adapted to be connected at one end thereof to a rotor hub. An aft fairing structure is carried by the spar and a balancing weight assembly is bonded and/or cured in place within the spar, proximate the free end thereof. The balancing weight assembly includes, in the preferred form thereof, a fiberglass weight tube housing having a pair of internally threaded weight tubes positioned therewithin. The weight tubes form bores having longitudinal axes in a common, substantially horizontal plane, and the axes each extend in a direction parallel to the axis of the spar. One or a plurality of externally threaded cylindrical weights are locked in each weight tube during balancing of the rotor blade. (Author)

2. AGRICULTURE

2B. Agricultural Economics

PB80-100076 PC **A04**/MF **A01**
Economic Research Service, Washington, DC.
Les Facteurs de l'Essor Agricole aux Etats-Unis (How the United States Improved its Agriculture),
Raymond P. Christensen, William E. Hendrix, and Robert D. Stevens. 1963, 61p
Text in French. See also English version, PB-292 863. Sponsored in part by Agency for International Development, Washington, DC.

In this translation of an English publication titled 'How the United States Improved its Agriculture', are the factors that gave rise to the tremendous increase in agricultural production such as fast agricultural areas, favorable political conditions, expanding technology, and the resultant use of fertilizers, examined. Cost vs. profit considerations are also graphically illustrated. Yields per hectare of lesser developed countries are compared with those of Japan and of the United States and ways to increase the production and to stimulate the economies are briefly discussed.

PB80-100092 PC **A03**/MF **A01**
Department of Agriculture Extension Service, Washington, DC.
Voir pour Croire (Seeing is Believing),
Helen Strow, and Amy Cowing. Jan 60, 27p
Text in French. See also English version, PB-293 605. Sponsored in part by Agency for International Development, Washington, DC.

This translation of an English publication titled 'Seeing is Believing' elaborates this theme with the aid of illustrations. Reasons for utilizing visual aids as a way to improve agricultural production and for the introduction of new methods, are listed. How to obtain the most receptive audience and present the most convincing demonstrations, are discussed.

PB80-100167 PC **A02**/MF **A01**
Economic Research Service, Washington, DC.
Sources et Causes de l'Accroissement de la Production Agricole aux Etats-Unis: Suggestions pour l'Agriculture aux Indes (Sources and Causes of Increased Farm Production in the United States: Implications for Indian Agriculture),
Glen T. Barton, and H. L. Stewart. Aug 58, 24p
Text in French. Sponsored in part by Agency for International Development, Washington, DC.

In this translation of an English publication titled 'Sources and Causes of Increased Farm Production in the United States' are the factors considered that have led to the enormous increase in agricultural production in the United States, with emphasis on the period during and following the Second World War. Although many of these factors have a parallel in India, a similar large increase in production did not take place. The analysis lists as a major cause of the disparity, the difference in attitudes between the farmers, the American being considered mainly with profit, the Indian sacrificing his standard of living increase, to provide his daughters with a dowry. Hope is expressed that, since many factors are similar between the two countries, an increase in production will be obtained from learning from the United State's experience.

PB80-100332 PC **A03**/MF **A01**
National Project in Agricultural Communications, East Lansing, MI.
Les Campagnes de Vulgarisation Agricole (Campaigns in Agricultural Extensions Programs),
John W. Spaven. 1960, 29p
Text in French. See also English version, PB-292 879. Sponsored in part by Agency for International Development, Washington, DC.

The report contains reasons for and ways of launching a campaign to increase agricultural production presented with the aid of illustrations. Five major steps are outlined: Creating a committee, defining the objectives, setting up a calendar, establishing a budget, and documentation of the plan. Preparation of a task force to carry out this plan, obtaining of the necessary materials, and ways of implementing the program are considered.

PB80-100647 CP **T02**
Foreign Agricultural Service, Washington, DC. Data Systems Div.
Foreign Production, Supply and Distribution of Agricultural Commodities.
Data file,
Richard J. Cannon, Eldon C. Hildebrandt, and Nancy O. Palmerino. 1979, mag tape USDA/DF-79/007
Supersedes rept. no. USDA/DF-79/001, PB-292 033.
Source tape is in EBCDIC character set. Character set restricts preparation to 9 track one-half inch tape only. Identify recording mode by specifying density only. Call NTIS Computer Products if you have questions.

This file contains foreign production, supply and distribution information. This includes harvards production, beginning stocks, total imports, total exports, total domestic use and ending stocks. Commodity coverage includes grains, rice, dairy, poultry, livestock, cotton, coffee, sugar, tobacco and cigarettes. The most recent year reported is 1979. Complete supply and distribution data are not always available. When only production figures are reported, this will be indicated by a 'Production Only' flag in the record.

PB80-101678 PC **A05**/MF **A01**
Economics, Statistics, and Cooperative Service, Washington, DC. International Economics Div.
Report Assessing Global Food Production and Needs as of April 15, 1979.
Oct 79, 98p ESCS-61

The study assesses global food production and needs and suggests that the lowest income countries' unmet food needs are quite large relative to their indigenous food production and many times greater than the largest food aid transfers on record. The study suggests that accelerated growth in indigenous food production, increased export earnings to allow larger commercial imports, and more uniform distribution of food supplies across population groups within countries over a number of years is needed if food needs are to be met. The food needs and financial data and production performance indicators cited in the study also suggest that the most serious unmet food needs are concentrated in the poorest third of the lowest income countries and that the method of distributing food aid to meet unmet needs is as important as the amount of aid distributed.

PB80-103484 PC **A14**/MF **A01**
Economics, Statistics, and Cooperatives Service, Washington, DC.
Structure Issues of American Agriculture.
Agricultural economic rept.,
J. B. Penn. Nov 79, 309p AER-438

How farming is organized, who controls it, and where it is heading is the subject of the report. The essays touch on important aspects of farm structure and the many forces shaping the U.S. agricultural system. The topics covered include Government policies; number and size of farms; land, water and energy use; tax and income policies; marketing; cooperatives; off-farm employment; and rural population. The report was developed to provide background for a national dialogue on farm structure.

PB80-106792 PC **A05**/MF **A01**
Department of Agriculture, Washington, DC.
Comment Creer une Cooperative (How to Start a Cooperative),
Irwin W. Rust. 1963, 95p
Text in French. Sponsored in part by Agency for International Development, Washington, DC.

This translation of two English publications, one titled 'How to Start a Cooperative', the other 'Sample Legal Documents for New Cooperative' covers the following: (1) What is a cooperative. When to use a cooperative. Number of members and how to evaluate the expected turnover; (2) The preparation by an investigative committee. Evaluation of capital, expenses, stocks, syndication, loans; (3) How to organize the first meeting with the members; (4) Work which must be accomplished by the organization committee. Recording of the rules and chart. Recording of contract, membership; (5) Organization of a second meeting; and (6) Conditions for success. Knowledge of social legislation. Need of lawyers. Election of the board of directors.

2C. Agricultural Engineering

DOE/ET/28442-1 PC **A09**/MF **A01**
Energetics Marketing and Management Associates Ltd., San Francisco, CA.
Mountain Home Geothermal Project: Geothermal Energy Applications in an Integrated Livestock Meat and Feed Production Facility at Mountain Home, Idaho.
A. B. Longyear, W. R. Brink, L. A. Fisher, R. H. Matherson, and J. A. Neilson. Feb 79, 185p
Contract ET-78-C-07-1704

The Mountain Home Geothermal Project is an engineering and economic study of a vertically integrated livestock meat and feed production facility utilizing direct geothermal energy from the KGRA (Known Geothermal Resource Area) southeast of Mountain Home, Idaho. A system of feed production, swine raising, slaughter, potato processing

and waste management was selected for study based upon market trends, regional practices, available technology, use of commercial hardware, resource characteristics, thermal cascade and mass flow considerations, and input from the Advisory Board. The complex covers 160 acres; utilizes 115 million Btu per hour (34 megawatts-thermal) of geothermal heat between 300 exp 0 F and 70 exp 0 F; has an installed capital of $35.5 million;produces 150,000 hogs per year, 28 million lbs. of processed potatoes per year, and on the order of 1000 continuous horsepower from methane. The total effluent is 200 gallons per minute (gpm) of irrigation water and 7300 tons per year of saleable high grade fertilizer. The entire facility utilizes 1000 gpm of 350 exp 0 F geothermal water. The economic analysis indicates that the complex should have a payout of owner-invested capital of just over three years. Total debt at 11% per year interest would be paid out in 12 (twelve) years. (ERA citation 04:049833)

LA-UR-79-788 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Livestock Farm Management, Electronics and Automation.
S. B. Nott. 1979, 15p CONF-790718-1
Contract W-7405-ENG-36
American Agricultural Economics Association meeting, Pullman, WA, USA, 29 Jul 1979.

Microcomputer hardware is being mass marketed which can keep livestock farm records and aid management decision making. Electronic equipment is being sold to automatically control and monitor individual animal feed consumption and milk production. Body temperature can be electronically measured. Agricultural economists should analyze this new technology. (ERA citation 04:049251)

PB80-100308 PC **A02**/MF **A01**
Agency for International Development, Washington, DC.
Irrigation par Aspersion (Sprinkler Irrigation),
Lester A. Robb. Nov 66, 18p
Text in French. See also English version, PB-294 272.

In this translation of an English publication titled 'Sprinkler Irrigation' are the factors, to be considered before placing of an irrigation system, such as type of culture, terrain, cost and climate outlined, and the possible ways of irrigation given. Types of sprinkler systems and calculations of water output at various pressures are included. A schematic of a sprinkler system, and a short bibliography are included.

PB80-100423 PC **A09**/MF **A01**
Woods Hole Oceanographic Institution, MA.
Wastewater Renovation and Retrieval on Cape Cod,
R. F. Vaccaro, P. E. Kallio, B. H. Ketchum, W. B. Kerfoot, and A. Mann. Aug 79, 191p EPA/600/2-79/176
Grant EPA-S-802037
Prepared in cooperation with Massachusetts Div. of Water Pollution Control, Westborough.

A rapidly increasing population on maritime Cape Cod has generated considerable interest in alternative wastewater disposal techniques which promise to maintain high groundwater quality and promote its conservation. The authors undertake an assessment of agricultural spray-irrigation as a potential means of lessening groundwater contamination and depletion. Experimental emphasis has been placed on variations in the rates and methods of wastewater application and in the types of renovation agricultural crops placed under wastewater irrigation. Results from these studies have been highly promising and suggest that under ideal circumstances, the coupling of secondary domestic effluent to animal forage crops can bring about a degree of wastewater renovation which exceeds direct disposal to sand filter beds and approaches the goals of tertiary treatments.

PB80-101553 PC **A10**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Agricultural and Chemical Engineering.
Potential Effects of Irrigation Practices on Crop Yields in Grand Valley.
Final rept.,
Gaylord V. Skogerboe, J. W. Hugh Barrett, Berry J. Treat, and David B. McWhorter. Aug 79, 208p EPA/600/2-79/149
Grant EPA-S-800687
See also report dated Jul 78, PB-286 510.

An analysis has been undertaken to determine the economically optimal seasonal depth of irrigation water to apply under conditions of both limited and plentiful water supply. The objective was to determine if general guidelines having practical utility could be postulated for all water supply situations. An extensive range of literature pertaining to the relationship between crop yield and the amount of water applied has been reviewed and differences suggested by various authors have been resolved. In addition, 32 plots of corn and 10 plots of wheat were grown under different irrigation regimes in the Grand Valley of Colorado to supplement the results of other researchers and to provide further insight into the effects of stress at different stages of plant growth.

PB80-102080 PC **A12**/MF **A01**
East Central Oklahoma State Univ., Ada. Animal Waste Technical Information Center.
Livestock and the Environment, A Bibliography with Abstracts. Volume VI.
Final rept. 1 Mar 78-28 Feb 80,
M. L. Rowe, and Linda Merryman. Aug 79, 251p EPA/600/2-79-150
Contract EPA-R-805151-02
See also Volume 5, PB-286 361.

Management and research information on animal wastes has expanded in recent years. This material has appeared in such diverse sources as journal articles, conference papers, university publications, government publications, magazine articles, books or book chapters, and theses. This bibliography was compiled in order to speed the flow of information on findings in one segment of livestock industry to other segments that could benefit from this technology.

PB80-102643 PC **A09**/MF **A01**
Benham-Blair and Affiliates, Inc., Oklahoma City, OK.
Long-Term Effects of Land Application of Domestic Wastewater: Dickinson, North Dakota, Slow Rate Irrigation Site.
Aug 79, 179p EPA/600/2-79/144
Contract EPA-68-02-2363
Prepared in cooperation with Engineering Enterprises, Inc., Norman, OK.

This report presents the findings of a study on the iong-term effects of applying treated domestic wastewater to farmland at Dickinson, North Dakota. On the test site, slow rate irrigation, using the border-strip method, has been practiced since 1959. Water, soil, and crop samples from this test site were compared with similar samples from a nearby control site irrigated with well water. Samples were also taken to detect coliform bacteria. Thirteen parameters were found to be present at significantly greater concentrations in the effluent used to irrigate the test site than in the river water used to irrigate the control site. Total coliforms were occasionally found in control and test site wells.

PB80-102817 PC **A10**/MF **A01**
New Mexico Inst. of Mining and Technology, Socorro.
Evaluation of a Hydrosalinity Model of Irrigation Return Flow Water Quality in the Mesilla Valley, New Mexico.
Final rept.,
Lynn W. Gelhar, and Stephen G. McLin. Aug 79, 205p EPA/600/2-79/173
Grant EPA-S-803565
Prepared in cooperation with New Mexico Water Resources Research Inst., Las Cruces.

A multi-cell lumped parameter model of irrigation-related water quality is applied to the Mesilla Valley, and irrigated valley encompassing roughly 40,500 hectares (100,000 acres) adjacent to the Rio Grande in southern New Mexico. The model simulates diversions and pumping to meet irrigation needs, irrigation return flows, chemical transformations in the soil, and mixing in groundwater reservoirs. Data on water quality at 35 surface and groundwater sites within the valley were collected on a monthly basis over two irrigation seasons. The USBR-EPA model is evaluated in several computer simulations covering the ten-year period from 1967 through 1976.

PB80-102908 PC **A07**/MF **A01**
Oklahoma State Dept. of Health, Oklahoma City.
Municipal Wastewater Treatment by the Overland Flow Method of Land Application.
Final rept. Jun 74-Mar 79,
Dempsey H. Hall, Joel E. Shelton, Charles H. Lawrence, Ernest D. King, and Raymond A. Mill. Aug 79, 142p EPA/600/2-79/178
Grant EPA-R-803218
Prepared in cooperation with Oklahoma Univ. Health Sciences Center, Oklahoma City.

The primary objectives of this study were to assess on a seasonal basis (winter and summer applications), the capabilities of treating raw (screened) municipal wastewater and secondarily treated wastewater (wastewater stabilization pond effluent), by applying the wastewaters to experimental overland flow treatment modules, on two slopes: 2 per cent and 3 per cent. Three application techniques in the raw treatment phase were employed for comparison: (a) rotating spray booms with fan nozzles, (b) fixed riser and trough methods were used for the secondary treatment phase. Comparison was made between the performance of the raw wastewater overland flow system and the performance of the wastewater stabilization pond receiving the same wastewater. Tests were conducted to determine removal efficiencies for the two treatment systems and the soil composition.

PB80-103609 PC **A10**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Agricultural and Chemical Engineering.
Irrigation Practices and Return Flow Salinity in Grand Valley.
Final rept.,
Gaylord V. Skogerboe, David B. McWhorter, and James E. Ayars. Aug 79, 220p EPA/600/2-79/148
Grant EPA-S-800687

This study was undertaken to evaluate the relationships between leachate volume and chemical quality. A numerical model of soil moisture and salt transport was used. Field data were collected on 63 research plots located in the Grand Valley, Colorado. From the calibration of the moisture flow model using infiltration data, water content profiles and storage change data, it was concluded that soil moisture flow could be adequately modeled for the Grand Valley. From comparisons of field and simulated data used in evluating the soil chemistry model, it was concluded that Total dissolved solids concentrations were adequately modeled but that individual ionic species concentrations were not. The TDS profile calculated at the beginning and end of the growing season show the salt concentration in the profile below the root zone to be relatively constant.

2D. Agronomy and Horticulture

PB80-100373 PC **A05**/MF **A01**
Ghana Academy of Sciences, Accra.
Le Jardin Potager en Pays Chaud (Better Vegetables),
Daniel A. Sekyere, and Sandy J. McCorvey. Jul 67, 100p
Text in French. See also English version, PB-292 871. Sponsored in part by Agency for International Development, Washington, DC., and Agency for International Development, Accra (Ghana).

The report describes the different ways of growing vegetables in warm countries. The choice of tools is described with drawings. The location of the garden must take in consideration the nature of the soil, the different levels of the land, the problem of irrigation, the closeness to the home. The preparation of the soil comes next with clearing, digging, enclosing of the plot. Different times are chosen for seeding and sowing in accordance with the regions: seaside, forests, northern or subtropical. Documents appended on hygiene for the garden, on vegetables' parasites and diseases, on sturdy varieties, culture for North African Coasts, rotation of crops, abundance of nutritious elements in the different vegetables. This is translated from a booklet called 'Better Vegetables'.

PB80-106800 PC **A08**/MF **A01**
Agricultural Research Service, Washington, DC.
L'Amelioration des Sols Salins (Improvement of Salt Marshes).
1963, 157p
Text in French. Sponsored in part by Agency for International Development, Washington, DC.

The problems of salinity covered in this booklet are: Where does the salt come from, why; different ways to treat salt marshes; effects of salinity in agriculture; toleration to salt of grains and vegetables; toleration of crops to exchangeable sodium; damages caused to plants by boron; use of briny water for irrigation in damp areas; chemicals which can be used to improve sodic soils; how to grow rice on salted lands; salinity and irrigation.

2E. Animal Husbandry

PB80-101884 PC **A03**/MF **A01**
Saint Jude Children's Research Hospital, Memphis, TN.
National and International Surveillance of Influenza Infections Among Domestic and Wild Species of Animals.
Annual rept. 1 Jul 78-30 Jun 79,
Robert G. Webster, and Virginia Hinshaw. 25 Apr 79, 31p DAB-VDP-05/101
Contract N01-AI-5-2524
See also report dated 20 Apr 77, PB-296 435.

The national and international network for the surveillance of influenza viruses in animals and birds has concentrated on the following areas of study during the current year: (1) Prevalence of influenza viruses in swine in USA - Completion of survey. (2) Evaluation of the economic impact of swine influenza and the efficacy of vaccination with A/NJ/8/76 (Hsw1N1). (3) Studies on the infectivity and transmissibility of avian Hsw1N1 viruses in a mammalian host (pigs). (4) Considerations of the possibility that A/USSR/90/77 (H1N1) strain may have emerged from an animal reservoir. (5) Surveillance od domestic and feral species for the prevalence of influenza viruses. (6) Detection of genetic reassortment of influenza A viruses in mixedly infected birds in nature and in the laboratory. (7) Evaluation of antigenic drift in animal influenza viruses. The project proposed last year on the development of suitable vaccine strains for use in humans from the viruses of birds and lower animals was not conducted. After a joint meeting with the Influenza Preparedness Committee, the concensus was that this program should be delayed until better guidelines are available for selection of strains to use.

PB80-106768 PC **A05**/MF **A01**
Agricultural Research Service, Washington, DC.
Poulailliers et Installations de Ponte (Housing and Equipment for Laying Hens),
Hajime Ota. 1965, 77p
Text in French. Sponsored in part by Agency for International Development, Washington, DC.

The publication discusses the factors that should be considered for a successful production of chickens. Number of animals, influence of climate on egg-laying, cooling, heating, ventilation, insulation, and construction are discussed. Drawings elaborate the important construction points of chicken coops. This publication is a translation of an English publication titled: 'Housing and Equipment for Laying Hens'.

PB80-106776 PC **A05**/MF **A01**
Agency for International Development, Washington, DC.
L'Entretien des Animaux de la Ferme (Raising Livestock).
1962, 79p
Text in French.

This translation of several English publications published by the Animal Husbandry Research Division, U.S. Department of Agriculture, covers the following:-The upkeep of a flock of egg-laying hens. What is needed to start. The size of the flock. The housing, the equipment necessary. How to care for them. -The upkeep of a dairy goat. How to choose the animal. Pasture and food. The cost of building a barn or to fence an area suitable. The breeding. Hygiene. -The keeping of a cow. How to choose the animal. How to care for it. Winter and summer feeding with costs. The barn. Breeding and calving. How to care for the calf. How to milk a cow and treat the milk. How to make butter. -Methods for raising beef. The upkeep of chickens, turkeys, ducks, geese, pigeons, sheep, rabbits, pigs is also included in this booklet.

2F. Forestry

PB80-105448 PC **A04**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
A Silvicultural Guide for Paper Birch in the Northeast.
Forest Service research paper (Final),
David A. Marquis, Dale S. Solomon, and John C. Bjorkbom. 1969, 52p NEFES/80-1, FSRP/NE-130

The report is a practical guide to the management of paper birch stands for timber production, covering both the establishment of new stands and the culture of existing stands. It includes a set of prescriptions describing specific treatments to be applied for a range of stand conditions and management objectives. Also the study provides some information about management of paper birch stands for aesthetic and other purposes.

PB80-105661 PC **A03**/MF **A01**
Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
Evaluating Product Potential in Standing Timber.
Forest Service research paper (Final),
Roland L. Barger, and Peter F. Ffolliott. 1970, 27p FSRP-RM-57

The timber quality inventory described recognizes and measures the basic stem characteristics and defect features that influence quantity and quality for most primary products. Stem features measured on sample trees include form defects, scar defects, and knot or limb characteristics. Timber inventory data obtained are used in conjunction with standard methods of estimating volume, scaling, and grading.

PB80-105679 PC **A02**/MF **A01**
Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
Sediment Yields from High Mountain Watersheds, Central Colorado.
Forest Service research paper (Final),
Charles F. Leaf. 1966, 20p FSRP-RM-23

A study of annual sediment yields from one carefully logged and two undisturbed watersheds in the Fraser Experimental Forest showed good correlation between peak streamflow and accumulated sediment volume. The relationships indicate that a major part of the sediment load is derived from channel erosion. The effects of logging on sediment yields are discussed, and magnitude-frequency relationships are developed for estimating long-term sediment yields.

PB80-105687 PC **A02**/MF **A01**
Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO.
Red Rot in Residual Ponderosa Pine Stands on the Navajo Indian Reservation.
Forest Service research paper (Final),
Paul C. Lightle, and Stuart R. Andrews. 1968, 17p FSRP-RM-37

Data from plots located in the Reservation revealed that red rot cull amounted to 15 percent of the gross volume of the virgin stand. Of several factors studied, tree age was most significant. Bark color in the lower trunk was a better criterion of red rot cull than broad age classes based on actual or estimated ages. The current system of marking removed 48 percent of the gross volume and 66 percent of the red rot volume. Alternate methods of marking are discussed.

3. ASTRONOMY AND ASTROPHYSICS

3B. Astrophysics

N79-32139/4 PC **A02**/MF **A01**
Telespazio, S.p.A., Rome (Italy).
Objects Classification: Some Methods of Interest in Astronomical Image Analysis.
A. Zandonella. Jun 79, 14p
Conf-Presented at the Intern. Workshop on Image Process. In Astron., Miramare, Italy, Jun. 1979.

The general elements of an object classification problem and its possible mode of solution are examined from a mathematical point of view. Some of the techniques which may be used in astronomical image analysis are summarized.

N79-32143/6 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Earth and Planetary Sciences.
Microcracks in Lunar Rocks.
Final Report, 1 Feb. 1971 - 30 Jun. 1979.
G. Simmons. 25 Sep 79, 7p NASA-CR-162277
Contract NGR-22-009-540

Lunar samples contain abundant open microcracks that have closure characteristics completely unlike any shocked terrestrial rock; however, the microcracks present in the lunar rocks before the rocks reached the surface of the moon were likely similar to the microcracks in the shocked terrestrial rocks. Because the microcracks present in the lunar rocks in situ inside the moon were different, radically different, from the microcracks present today in returned lunar samples, any property that is sensitive to microcracks measured on the returned lunar samples is inappropriate for predicting that property as a function of depth in the moon. Therefore, many data that have been measured already on lunar samples simply do not apply to rocks in situ inside the moon. A plausible mechanism with which to account for the difference in microcrack characteristics of lunar samples on the surface of the moon and the microcrack characteristics of lunar rock in situ inside the moon is thermal cycling during residence on the moon's surface.

N79-32144/4 PC **A08**/MF **A01**
Eyring Research Inst., Provo, UT.
Lunar Physical Properties from Analysis of Magnetometer Data.
Final Report, 1 Nov. 1975 - 31 Aug. 1979.
W. D. Daily. 31 Aug 79, 173p NASA-CR-162288, ERII-800-0045
Grant NSG-2082

The electromagnetic properties of the lunar interior are discussed with emphasis on (1) bulk, crustal, and local anomalous conductivity; (2) bulk magnetic permeability measurements, iron abundance estimates, and core size limits; (3) lunar ionosphere and atmosphere; and (4) crustal magnetic remanence: scale size measurements and constraints on remanence origin. Appendices treat the phase relationship between the energetic particle flux modulation and current disc penetrations in the Jovian magnetosphere (Pioneer 10 inbound) theories for the origin of lunar magnetism; electrical conductivity anomalies associated with circular lunar maria; electromagnetic properties of the Moon; Mare Serenitatis conductivity anomaly detected by Apollo 16 and Lunokhod 2 magnetometers; and lunar properties from magnetometer data: effects of data errors.

N79-32145/1 PC **A03**/MF **A01**
Stanford Univ., CA. Inst. for Plasma Research.
Radiative Dominated Cooling of the Flare Corona and Transition Region.
S. K. Antiochos. Aug 79, 26p NASA-CR-162171, SU-SUIPR-792
Contracts NAS8-32263, NGL-05-020-272

Models in which radiation dominates cooling flare loops are investigated. The radiative models are found to predict a differential emission measure (Q) proportional to T to the (l+1) power, where l measures the dependence of the radiative loss coefficient on temperature, lamda (T) approximately T to the (-l) power. It is concluded that the radiative models are incapable of explaining the observed temperature dependence of Q for flare coronal and transitional plasma. The models suggest that large mass motions (velocities of the order of the sound speed) may be required.

N79-32146/9 PC **A05**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.

Field 3—ASTRONOMY AND ASTROPHYSICS

Group 3B—Astrophysics

Results of Coronal Hole Research: An Update.
R. M. Wilson. Jul 79, 96p NASA-TM-78237

Annotated abstracts are presented for 221 papers containing results obtained during the 1976 period. Citations are included for 21 additional reports not reviewed.

N79-32149/3 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Spectrometer of High Energy gamma Quanta.
I. D. Blokhintsev, A. S. Melioranskiy, L. F. Kalinkin, Y. I. Nagornykh, and Y. A. Pryakhin.
Aug 79, 32p NASA-TM-75647, PR-416
Contract NASW-3199
Tran-Transl. Into English of "Spektrometr gamma-Kvantov Vysokikh Energiy" Acad. Of Sci. Sssr, Moscow, Rept. Pr-416, 1978 25 p. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif.

A detailed description of the apparatus GG-2M is given. The spectrometer contains a Cerenkov and scintillation (including anticoincidence) counter. The energies of the gamma quanta are measured by a shower calorimeter, in which scintillation counters are used in the capacity of detectors. Results are given for tuning the device on mu-mesons of cosmic rays. The data of physical tuning allow more reliable interpretation of the results of measurements which are received on the satellites.

PB80-100779 Not available NTIS
National Bureau of Standards, Washington, DC.
Ultraviolet Observations of Cool Stars. VIII. Interstellar Matter Toward Procyon.
Final rept.,
R. C. Anderson, R. C. Henry, H. W. Moos, and J. L. Linsky. 15 Dec 78, 5p
Pub. in Astrophysical Jnl. 226, n3, p883-887, 15 Dec 78.

The profile of the chromospheric L alpha emission line of the F5 IV-V star Procyon (alpha Canis Minoris, d = 3.5 pc) has been measured using the high-resolution Princeton spectrometer aboard NASA's Copernicus satellite. L alpha absorption lines of interstellar deuterium and hydrogen are distinctly present. The average number density of interstellar hydrogen along the line of sight is found to be 0.11 + or - 0.02 cu cm, similar to the densities that have been found in the directions of the stars epsilon Eridani, epsilon Indi, and alpha Centauri A. These stars are all within 3.5 pc of the Earth. The ratio of deuterium to hydrogen in the direction of Procyon is found to be 1.3 (+1.2, -0.5) x times 0.00001.

PB80-107097 PC **A08**/MF **A01**
National Geophysical and Solar-Terrestrial Data Center, Boulder, CO.
Solar-Geophysical Data Number 420, August 1979. Part I (Prompt Reports). Data for July 1979, June 1979,
Helen E. Coffey. Aug 79, 170p SGD-420-PT-1, NOAA-79092402
See also Number 419, Part 1, PB-300 836.

This prompt report provides data for July 1979 on: alert periods, daily solar indices, solar flares, solar radio emission, spacecraft observations, coronal holes, solar wind measurements, inferred interplanetary magnetic field polarities, mean solar magnetic field and Boulder Geomagnetic Substorm Log. It also provides data for June 1979 on: daily solar activity center, sudden ionospheric disturbances, solar x-ray radiation, solar radio emission, cosmic rays, geomagnetic indices and radio propagation indices.

PB80-107105 PC **A06**/MF **A01**
National Geophysical and Solar-Terrestrial Data Center, Boulder, CO.
Solar-Geophysical Data Number 420, August 1979. Part II (Comprehensive Reports). Data for February 1979, January 1979,
Helen E. Coffey. Aug 79, 125p SGD-420-PT-2, NOAA-79092403
See also Number 419, Part 2, PB-300 837.

This comprehensive report provides data for February 1979 on: active regions, synoptic solar maps, solar radio emission, energetic solar particles and plasma, and solar x-ray radiation. It also provides synoptic charts and abbreviated calendar record for January 1979. The miscellaneous data includes solar radio emission, cosmic rays - April and May 1979, Solar flares - January 1979, and regional flare index - December 1978.

4. ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

AD-A073 852/6 PC **A03**/MF **A01**
Rice Univ Houston TX Dept of Space Physics and Astronomy
Birkeland Currents and Ring Currents in the Computer Simulation of the Substorm of 19 September 1976,
M. Harel, R. A. Wolf, P. H. Reiff, and M. Smiddy.
7 Feb 79, 28p SCIENTIFIC-1, AFGL-TR-79-0041
Contract F19628-77-C-0005

Several computer runs simulating the behavior of the inner magnetosphere during a substorm-type event that occurred on 19 September 1976, have been completed and analyzed. The computer model simulates many aspects of the behavior of the closed-field-line portion of the earth's magnetosphere, and the auroral and subauroral ionosphere. For these regions, the program self-consistently computes electric fields, electric currents, hot-plasma densities, plasma velocities and other parameters. Presented here are some highlights of the results of the event simulation. Predicted electric fields for several times during the event agree reasonably well with corresponding data from satellite S3-2. Detailed discussion is presented for a case of rapid subauroral flow that was observed on one S3-2 pass and is predicted by computer runs. The computed global distribution of Birkeland current agrees reasonably well with the observations of Iijima and Potemra. In the simulated substorm-type event, plasma-sheet ions are injected earthward of synchronous orbit near midnight and drift westward, forming a ring half-way around the earth by the end of the simulation, 3 hours after substorm onset. The dispersion of ion energies on the dusk side near synchronous orbit has the form commonly observed by McIlwain and collaborators. It appears that the ions would form a complete ring if the simulation were continued for several more hours.

AD-A073 892/2 MF **A01**
Michigan Univ Ann Arbor
A Simulation of the Midlatitude Plasmasphere and Ionosphere.
Final rept. 1 Dec 76-31 Mar 79,
E. R. Young, D. G. Torr, and P. Richards. 31 May 79, 139p AFGL-TR-79-0125
Contract F19628-77-C-0007
Availability: Microfiche copies only.

Plasma and heat flow are simulated for an entire field tube from 120 km in the N. hemisphere spanning the plasmasphere to 120 km in the S. hemisphere. (Author)

AD-A073 893/0 PC **A02**/MF **A01**
TRW Defense and Space Systems Group Redondo Beach CA
Direct Simulation Monte Carlo Description of Ionospheric Chemistry.
Interim rept.,
Takashi Sugimura, and Graham Bird. May 79, 25p SCIENTIFIC-2, AFGL-TR-79-0114
Contract F19628-77-C-0020

The direct simulation Monte Carlo method has been extended to describe the detailed chemistry in the ionosphere. A theoretical relationship between the continuum reaction rates and the reaction cross sections required for the Monte Carlo simulation has been established. The effects of high energy electrons on the ambient ionosphere has been investigated and details of the nonequilibrium results are presented. (Author)

AD-A073 898/9 PC **A04**/MF **A01**
Utah State Univ Bedford MA Electro-Dynamics Labs (SRL)
Interpretation of NO and OH Emission from 1976 Airborne Measurements,
John H. Schummers, and Ronald J. Huppi. 1 Jan 79, 58p EDL-SRL-79-1, SCIENTIFIC-1, AFGL-TR-79-0027, DNA-HAES-80
Contract F19628-78-C-0018

Measured infrared emission enhancements and backgrounds in the 2.83 to 3.04 micron region are analyzed. The measurements used for the analyses were collected from the AFGL NKC-135A flying laboratory during the 1976 DNA/AFGL ICECAP program. Chemiluminescence from hydroxyl fundamental chemistry was found to be the major background emitter in the measurement region, and aurorally excited nitric oxide first overtone chemistry is believed to account for large observed enhancements. Assuming the enhancements result from NO chemistry, calculations were made to determine the percentage of the total auroral electron energy which is radiated as first overtone nitric oxide photons. The calculated percentage was found to vary from one measurement period to the next. It ranged from .4% to 1.0%, which probably indicates that the excitation is dependent on the auroral penetration depths and characteristics. (Author)

AD-A073 917/7 PC **A02**/MF **A01**
Atmospheric and Environmental Research IN Cambridge Ma
CS2 and COS in the Stratospheric Sulphur Budget,
Nien D. Sze, and Malcolm K. W. Ko. 14 Mar 79, 4p AFGL-TR-79-0189
Contract F19628-78-C-0215
Pub. in Nature, v280 n5720 p308-310, 26 Jul 79.

No abstract available.

AD-A074 212/2 PC **A03**/MF **A01**
Max-Planck-Inst Fuer Aeronomie Lindau-ueber-Northeim (Germany F R)
Results of a Comparison between the Lindau Foil Cloud Experiment and the Inflatable Falling Sphere Experiment.
Technical rept.,
G. Rose, and H. U. Widdel. Jul 79, 30p
ERADCOM/ASL-CR-79-076-1
Grant DA-ERO-75-G-076

Between 10 and 24 April 1974, a series of rocket flights was launched at White Sands Missile Range as part of a cooperative project between the Arbeitsgruppe D-Schicht-Aeronomie of the Max-Planck-Institute fur Aeronomie and the US Army Atmospheric Sciences Laboratory. Primarily, the purpose was to compare wind sensing techniques in the height range between 95 and 80 km. In addition, the foil chaff clouds are capable of providing neutral air density over the height interval from 85 to 92 km. The inflatable falling sphere experiment is capable of deriving density, tempeature, and wind data between 35 and 90 km, with less accuracy above 85 km. The foil chaff cloud is primarily intended to measure winds and wind shears between 95 and 75 km with good height resolution due to its low fall velocity. The foil chaff can also be used to determine density, pressure and--within certain limits--air temperature for smaller height interval from 95 to about 85 km. However, some assumptions have been made in deriving the additional thermodynamic data. (Author)

AD-A074 275/9 PC **A04**/MF **A01**
Naval Environmental Prediction Research Facility Monterey CA
Modeling the Refractive Index Structure Parameter in the Marine Planetary Boundary Layer.
Final rept.,
Stephen D. Burk, Andreas K. Goroch, Alan I. Weinstein, and Hans A. Panofsky. Jun 79, 58p
Rept no. NEPRF-TR-79-03

This report summarizes the proceedings, conclusions and recommendations of a two-day workshop (30-31 Jan 1979) on refractive index structure parameter, Cn(2), in the marine planetary boundary layer (MPBL). Scaling laws are described that are adequate to predict Cn(2) in the surface layer to an accuracy of approximately a factor of two. A stepwise procedure is described to predict Cn(2) using these scaling steps. No generally accepted quantitative scaling laws exist in the upper MPBL. Simple second-moment turbulence models hold the best promise for Cn(2) prediction in the upper MPBL at this time. After verification these models can be used by themselves or to generate upper MPBL scaling laws. (Author)

AD-A074 370/8 PC **A04**/MF **A01**
Naval Research Lab Washington DC
A Global Ionospheric Model,
Joe Thomason, Glenn Skaggs, and John Lloyd.
20 Aug 79, 56p NRL-8321, AD-E000 323

This paper describes a global ionospheric model used by NRL to analyze the performance of high-frequency radar systems. The model described is based primarily on numerical maps derived from reports by a network of vertical sounding stations. Indices for the E, F sub 1, and F sub 2 layers are used to generate electron density profiles. An exponential tail is added to the E-region profile to account for D-region effects. Numerical maps of the sporadic-E indices are available but are not included in the electron density profile. This paper also describes several applications of the ionospheric model and includes an atlas of plasma frequency contour maps generated with the model.

DOE/EV-0040 PC **A18**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Multistate Atmospheric Power Production Pollution Study - MAP3S. Progress Report for FY 1977 and FY 1978.
Jul 79, 413p
Contract W-7405-ENG-48

Research progress on the transport, transformation, and fate of pollutants released by energy-related activities is summarized. Information is reported under the following section headings: power production emissions; non-power production emissions; measuring pollutants and their properties; regional pollutant distribution; transport; pollutant transformation; surface removal processes; wet removal processes; weather and climate modification; numerical modeling and analysis; special activities; and, MAP3S research directions. (ERA citation 04:050562)

LA-7926-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Effects of Rocket Exhaust Products in the Thermosphere and Ionosphere.
J. Zinn, C. D. Sutherland, and M. B. Pongratz. Jul 79, 23p
Contract W-7405-ENG-36

This report reviews the current state of understanding of the problem of ionospheric F-layer depletions produced by chemical effects of the exhaust gases from large rockets, with particular emphasis on the Heavy Lift Launch Vehicles (HLLV) proposed for use in the construction of solar power satellites. Also included, for verification of the computer model, is a computation of the effects of the Skylab I launch, for which experimental data exist. Launch plans for the HLLV call for orbital injection at 100- to 120-km altitude, and confinement of the main engine exhaust emissions to below 120 km. However, the exhaust products diffuse gradually upward to the ionospheric F-layer, where they react chemically with 0 exp + ions, leading to the removal of ionization and causing a steady production of H atoms. The ion removal will lead to predictable consequences for HF communications systems and unpredictable effects on global weather. The number of H atoms produced per launch is about one-sixth of the normal total thermospheric H atom inventory. Detailed model computations of HLLV exhaust effects are described in this report. (ERA citation 04:050651)

LBL-9315 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Infrared Radiative Cooling.
P. Berdahl, and M. Martin. May 79, 5p CONF-790541-40
Contract W-7405-ENG-48
International Solar Energy Society meeting, Atlanta, GA, USA, 28 May 1979.

Measurements are reported of the thermal infrared radiance of the sky, at Tucson, AZ; San Antonio, TX; and Gaithersburg, MD. The spectral resolution is approximately 2 microns in the range of 8 to 20 microns. Samples of data show that a computer model of the atmosphere is capable of approximate prediction of the measurements if the meteorologic state of the atmosphere is completely known. Data for Gaithersburg and Tucson exhibit a correlation between the 8.1 to 13.7 micron radiance of the zenith and the all-wave (4-40 micron) radiance of the entire sky. This correlation suggests that it will become possible to use pyrgeometer data to estimate spectral radiation from different parts of the sky. The new information concerning infrared sky radiance obtained from the current measurements can be applied to improved estimates of infrared heat transfer from (i) passive radiative cooling systems, (ii) the outer glazing of solar collectors, and (iii) the external skin of buildings. (ERA citation 04:049741)

N79-31247/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
The Geometry of Stellar Occultation Measurements on Long-Duration Atmospheric Monitoring Missions.
D. R. Brooks. Jul 79, 27p NASA-TM-80138

Geometrical considerations are presented for analyzing use of the stellar occultation technique on long duration earth atmosphere monitoring missions. The simulated mission data are presented for three representative orbits. Bright near infrared stars are used as examples of how extensive global longitude-latitude coverage is obtained by performing occultation measurements on several stars during the course of a one year mission. A comparison is made with similar missions using the sun as a light source.

N79-31637/8 PC **A23**/MF **A01**
European Space Agency, Paris (France).
European Sounding Rocket, Balloon and Related Research, with Emphasis on Experiments at High Latitudes.
T. Halvorsen, and B. Battrick. Jun 78, 544p SP-135
Conf-Presented at ESA/CNES Symp., Ajaccio, Corsica, 24-29 Apr. 1978.

No abstract available.

N79-31859/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Results of Measurement of the Night Corpuscular Flux on the MR-12 Rockets in the JASPIC Project (Soviet Part of the Program).
S. I. Avdyushin, L. L. Bukusova, G. S. Ivanov-kholodnyy, T. V. Kazachevskaya, and M. A. Savelev. Aug 79, 11p NASA-TM-75691
Contract NASW-3199
Tran-Transl. Into English of "Rezultaty Izmereniya Nochnogo Korpuskulyarnogo Potoka NA Raketakh Mr-12 Po Proyektu Jaspic (Sovetskaya Chast Programmy)" Acad. Of Sci. Ussr, Moscow, 1979 7 p. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif.

In June 1978, a joint Soviet-American project (JASPIC) was conducted, the goals of which were: (1) the study of the flows of spilling electrons which act upon the middle-latitude ionosphere under nocturnal conditions (nocturnal corpuscular source of ionization); and (2) the mutual comparison of procedures for recording corpuscular radiations in the upper atmosphere, using meteorological and geophysical rockets.

N79-31863/0 PC **A07**/MF **A01**
Dartmouth Coll., Hanover, NH. Thayer School of Engineering.
Magnetopause Structure from Satellite Observations.
Final Technical Report, 1 Oct. 1977 - 30 Sep. 1978.
B. U. O. Sonnerup. 3 Oct 79, 140p NASA-CR-162286
Grant NSG-7292, Contract NSF ATM-74-08223

Observations on magnetopause structure are reported. Major topics covered include: classical reconnection, transport mechanisms, magnetospheric boundary layers, tearing modes, and Jupiter's magnetopause.

N79-32090/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Data on Atmospheric Transmission in the IR Spectral Region.
N. N. Faramonova, K. V. Kazakova, and A. M. Brounshteyn. Aug 79, 17p NASA-TM-75652
Contract NASW-3199
Tran-Transl. Into English of "Dannye O Propuskanii Atmosfery V Ik Oblasti Spektra" Acad. Of Sci. USSR, 1979 13 p. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif.

The weakening of radiation by the atmosphere in the infrared region of the spectrum was studied. The instrument used for the measurements was the IKAU-1 infrared atmospheric unit, and measurements were carried out both on an inclined path and a near-earth horizontal path.

PB80-101512 PC **A99**/MF **A01**
NATO Committee on the Challenges of Modern Society, Brussels (Belgium).
Air Pollution: Proceedings of the International Technical Meeting on Air Pollution Modeling and Its Application (8th), Held at Louvain-La-Neuve, Belgium on 20-23 September, 1977.
1977, 763p NATO/CCMS-80
See also report dated 1975, PB-251 328. NATO furnished.

Contents:
- Quantitative application of models to the development of control strategy;
- Comparison of different diffusion models;
- Guidelines for the application of air quality simulation models in the NATO community;
- Influence and choice of meteorological inputs;
- Considerations of transformation processes of air pollutants in models;
- Modeling in complex terrain;
- Novel approaches in air modeling;
- Transnational air quality modeling;
- Estimating the combined effects of emissions from several large stacks.

PB80-106974 PC **A06**/MF **A01**
World Data Center A for Solar-Terrestrial Physics, Boulder, CO.
Auroral Electrojet Magnetic Activity Indices AE(11-12) for January-June 1975,
J. H. Allen, C. C. Abston, J. E. Salazar, and J. A. McKinnon. Aug 79, 119p UAG-73, NOAA-79092406
See also report dated 1974, PB-263 927.

The Auroral Electrojet index (AE) is discussed and a brief description is given of the derivation of 11-12 station 1.0-min AE indices for January-June 1975. Tables are given of hourly average indices for each day, of the stations making the main contribution to the hourly indices, and of the average monthly quiet-time level of horizontal fields (H) at each magnetic observatory. Graphs of the index variations are included for each day of the first half of 1975 and for the frequency and amplitude of extreme variations at each site.

4B. Meteorology

AD-A073 874/0 PC **A99**/MF **A01**
Naval Weather Service Detachment Asheville NC
Summary of Synoptic Meteorological Observations (SSMO) Selected South Pacific Island Marine Areas Volume 3. Area 17 - Tahiti Island and Moorea Island, Area 18 - Tuamotu Archipelago, Area 19 - Pitcairn Island, Area 20 - Easter Island, Area 21 - Isla San Ambrosio and Isla San Felix, Area 22 - Islas Juan Fernandez, Area 23 - Norfolk Island, Area 24 - Chatham Island.
Sep 79, 641p
See also Volume 4, AD-A073 875.

This report presents marine climatological data for specific coastal areas in 21 different tables including weather occurrence, wind direction and speed, cloud amount, ceiling height, visibility, precipitation, dry bulb, relative humidity, air-sea temperature difference, sea height and period, sea surface temperature and sea level pressure. (Author)

AD-A073 875/7 PC **A99**/MF **A01**
Naval Weather Service Detachment Asheville NC

Summary of Synoptic Meteorological Observations (SSMO), Selected South Pacific Island Marine Areas, New Zealand. Volume 4. Area 25 - Auckland West, Area 26 - Auckland East, Area 27 - Cook Strait NW, Area 28 - Cook Strait, Area 29 - Hawke Bay, Area 30 - South Island NW, Area 31 - Foveaux Strait, Area 32 - Christchurch.
Sep 79, 640p
See also Volume 3, AD-A073 874.

This report presents marine climatological data for specific coastal areas in 21 different tables including weather occurrence, wind direction and speed, cloud amount, ceiling height, visibility, precipitation, dry bulb, relative humidity, air-sea temperature difference, sea height and period, sea surface temperature and sea level pressure. (Author)

AD-A073 959/9 PC **A05**/MF **A01**
Naval Postgraduate School Monterey CA
Refinement of a Statistical Diagnostic Model of Marine Fog using FNWC Model Output Parameters.
Master's thesis,
Steve O'Neal Ouzts. Jun 79, 88p Rept no. NPS63-79-002
Errata sheet inserted.

They study represents a continuation of the development of a model output statistics scheme to specify marine fog over the open ocean and in coastal waters. Thirty-seven direct and derived Fleet Numerical Weather Central model output parameters, monthly climatological fog frequencies, combinations of the aforementioned parameters (i.e. interactive parameters) and a persistence parameter are used as predictors in a stepwise multiple linear regression approach to estimate a predictand defined as marine fog probability. The predictand is categorized in two ways, in one case (FOGCAT 1) as smoothed probabilities for 0 to 100% as a function of present weather, past weather, visibility and low cloud type; and, in another case (FOGCAT 2) as a limited number of discrete probabilities (to include 0 and 100%) derived form presetn weather, past weather and visibility only. This study derives diagnostic regression equations only using as a dependent data sample over 24,000 surface synoptic ship observations at 0000 GMT for June through August 1976 and 1977. The predictor parameters contributing most significantly to the variance are sensible and evaporative heat fluxes, monthly climatologial fog frequencies, and meridional wind speed.

AD-A074 137/1 PC **A05**/MF **A01**
New York Univ Bronx Geophysical Sciences Lab
On the Growth of the Spectrum of a Wind Generated Sea According to a Modified Miles-Phillips Mechanism and Its Application to Wave Forecasting,
Tokujiro Inoue. Jul 67, 83p Rept no. GSL-TR-67-5
Contract N62306-1589

It is necessary to develop detailed numerical forecasting techniques that accurately specify the process of wave generation because the need for accurate wave forecasts is increasing. The growth of the wave spectrum can be approximated by the combined effect of two mechanisms to a point where the crest of the wave breaks on a nonlinear effect becomes dominant. One mechanism is the Phillips resonance mechanism for wave generation, and the other is the exponential growth mechanism, originally proposed by Miles. Recently, this second growth mechanism was revised by Phillips in terms of the wave-induced atmospheric perturbations. Calculations suggest that this new mechanism explains the available observations, which had previously been unexplainable from the original instability growth mechanism. To verify the theory, various spectra estimated from wave observations are used, along with measurements provided by fetch limited field experiments made by Snyder and Cox. After some assumptions about energy dissipation are applied, the spectral-growth equation, which is a function of frequency, wind speed, and duration (or fetch), is obtained.

AD-A074 211/4 PC **A03**/MF **A01**
Navy Weather Research Facility Norfolk VA
Anomalies of Sea Surface Temperatures and Currents in the Jacksonville, Florida Fleet Operating Area,
J. W. Nickerson. 31 Aug 66, 49p Rept no. NWRF-TECHNICAL PAPER-12-66

The Jacksonville Fleet Operating Area, and the coastal sections of Georgia and northern Florida are areas that have periods of fog and low stratus that are difficult to forecast. A major factor in the formation of this fog and low stratus is the ocean which provides the required moisture and variable temperature conditions. This paper presents a mesoscale climatological study of the sea surface temperatures (SST) for the area. Several case studies have been provided to relate actual patterns to the climatic charts and to illustrate that SST charts can be prepared on a daily basis. A more accurate knowledge of the sea surface temperature conditions, operationally and climatologically should greatly improve fog and low stratus forecasting capability. This study is of the Jacksonville Fleet Operating Area, but the principles could be applied to any area of the world where the ocean provides temperature variations sufficient to cause fog or low stratus conditions.

AD-A074 276/7 PC **A04**/MF **A01**
Army Electronics Research and Development Command White Sands Missile Range NM Atmospheric Sciences Lab
Evaluation of the Saturation Resistant Crosswind Sensor.
Technical rept.,
Ruben Rodriguez, and William J. Vechione. Jul 79, 68p Rept no. ERADCOM/ASL-TR-0035

Integrated path crosswinds were measured at Biggs Optical Range, Biggs Army Airfield, Fort Bliss, Texas, during the period of 31 January to 8 March 1978 with the Saturation Resistant Crosswind Sensor, a bistatic system that measures crosswinds by detecting and analyzing the movement of atmospheric scintillations. Data collected with this sensor were compared to integrated path wind averages measured by the calibrated anemometer array. This report presents X-Y scatter plots, derived weighting functions, and wind measurement comparison plots. The results of the tests show that the major weighting (or contribution of thermal turbulence) to the system optics with a 500-m baseline is centered about 350 m from the receiver and approximates a slope intercept form Y = 0.85X - 10.02. With a 2,000-m baseline, the weighting function maximum is shifted to about 1400 m and approximates the slope intercept form Y = 1.57X - 0.43. (Author)

AD-A074 337/7 PC **A05**/MF **A01**
City Univ of New York Inst of Marine and Atmospheric Sciences
TWINDX: A Planetary Boundary Layer Model for the Winds in Extratropical and Tropical Ocean Areas.
Final rept.,
Willard J. Pierson. Jun 79, 93p NEPRF-CR-79-02
Contract N00014-77-C-0206

The theory and programming details of a planetary boundary layer model that describes the winds from the surface of the ocean to several hundred meters in the tropics and from the surface to the gradient wind level in extratropical regions are given. The model, called TWINDX for Trade Winds and Wind EXpanded Scale, is for use on a 123 by 123 polar stereographic projection. The required input fields are the atmospheric pressure at the sea surface, and the sea surface temperature for the extratropical regions. For the tropical regions, the sea surface pressure field and field for the height of the lifting condensation level are needed. Various options are given, and additional options and improvements are described. The outputs are the vector wind at an elevation of 19.5 meters and the vector wind that would have been measured in a neutrally stratified atmosphere at an elevation of 19.5 meters, along with other fields, as options, that are useful for analysis and interpretation. The vector wind for a neutral stratification can then be compared with the output of the SASS on SEASAT to remove aliases and provide a wind field that can, in turn, be used to improve on the initial values required for a numerical weather prediction. Since the preparation of this report, additional material on SEASAT winds and the planetary boundary layer has appeared; a list of supplementary references has been added. (Author)

NUREG/CR-1024 PC **A04**/MF **A01**
National Hurricane and Experimental Meteorology Lab., Coral Gables, FL.
An Initial Assessment of Flash Density and Peak Current Characteristics of Lightning Flashes to Ground in South Florida,
Michael W. Maier, Albert G. Boulanger, and Robert I. Sax. Sep 79, 52p
Contract NRC-01-78-009

Cloud-to-ground (CG) lightning flash density and first stroke peak current characteristics were determined during three months of observation in South Florida. The resultant distributions of these parameters are presented and compared with previous studies. The data are presented in the context of estimating the probability of lightning strikes to surface structures. The limitations of these estimates are described as well as additional research necessary to refine such estimates on a national scale.

N79-31885/3 PC **A05**/MF **A01**
Texas A and M Univ., College Station.
Convective Rainfall Estimation from Digital GOES-1 Infrared Data.
G. L. Sickler, and A. H. Thompson. Sep 79, 96p NASA-RP-1034

An investigation was conducted to determine the feasibility of developing and objective technique for estimating convective rainfall from digital GOES-1 infrared data. The study area was a 240 km by 240 km box centered on College Station, Texas (Texas A and M University). The Scofield and Oliver (1977) rainfall estimation scheme was adapted and used with the digital geostationary satellite data. The concept of enhancement curves with respect to rainfall approximation is discussed. Raingage rainfall analyses and satellite-derived rainfall estimation analyses were compared. The correlation for the station data pairs (observed versus estimated rainfall amounts) for the convective portion of the storm was 0.92. It was demonstrated that a fairly accurate objective rainfall technique using digital geostationary infrared satellite data is feasible. The rawinsonde and some synoptic data that were used in this investigation came from NASA's Atmospheric Variability Experiment, AVE 7.

PATENT-4 154 089 Not available NTIS
Department of the Army Washington DC
Apparatus and Method for Measuring Liquid Water Content of a Cloud or Fog.
Patent,
Hugh R. Carlon. Filed 12 Jun 78, patented 15 May 79, 6p AD-D006 370/1, PAT-APPL-914 830
Supersedes PAT-APPL-914 830-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent describes an apparatus and method for measuring the liquid water content of a cloud or fog, which uses an environmentally controlled test chamber having a plurality of oppositely disposed windows selected to be optically transparent at a chosen wavelength of radiation. The windows of the chamber are positioned intermediate an infrared source and a wavelength scanning radiometer. An optical band pass filter is selected to pass radiation of a specific wavelength making the instrumentation substantially independent of cloud droplet size distribution enabling the measurement of only liquid water rather than water vapor.

PB80-106685 PC **A05**/MF **A01**
National Oceanic and Atmospheric Administration, Washington, DC. Environmental Data and Information Service.
Environmental Satellite Imagery, January 1979.
Key to meteorological records documentation no. 5.4.
Jan 79, 100p NOAA-79091401

The Key to Meteorological Records Documentation (KMRD) No. 5.4 series is issued monthly to describe current cloud data obtained by NOAA's operational environmental satellites. It contains

daily global satellite imagery in condensed form as a guide to data stored in the NOAA archive, and is designed to assist users in selecting data for research and climatological use. Global imagery from the TIROS-N satellite became operationally available and entered into the archives commencing with the January 1979 data.

PB80-106982 PC **A06/MF A01**
National Oceanic and Atmospheric Administration, Washington, DC. Environmental Data and Information Service.
Environmental Satellite Imagery, March 1979.
Key to meteorological records documentation no. 5.4.
Mar 79, 101p NOAA-79092105
See also report dated Mar 78, PB-296 057.

The Key to Meteorological Records Documentation (KMRD) No. 5.4 Series is issued monthly to describe current cloud data obtained by NOAA's operational environmental satellites. It contains daily global satellite imagery in condensed form as a guide to data stored in the NOAA archive, and is designed to assist users in selecting data for research and climatological use. Global imagery from the TIROS-N satellite became available beginning in January 1979.

PB80-107063 PC **A05/MF A01**
National Oceanic and Atmospheric Administration, Washington, DC. Environmental Data and Information Service.
Environmental Satellite Imagery, February 1979.
Key to meteorological records documentation no. 5.4.
Aug 79, 91p NOAA-79091402
See also report dated Mar 78, PB-296 057.

The Key to Meteorological Records Documentation (KMRD) No. 5.4 Series is issued monthly to describe current cloud data obtained by NOAA's operational environmental satellites. It contains daily global satellite imagery in condensed form as a guide to data stored in the NOAA archive, and is designed to assist users in selecting data for research and climatological use. Global imagery from the TIROS-N satellite became available beginning in January 1979.

PB80-107188 PC **A06/MF A01**
National Severe Storms Lab., Norman, OK.
Joint Doppler Operational Project (JDOP) 1976-1978.
Final rept.,
Don Burgess, Ralph J. Donaldson, Tom Sieland, John Hinkelman, and D. Sirmans. Mar 79, 106p
NOAA-TM-ERL-NSSL-86, NOAA-79092001
Color illustrations reproduced in black and white.

Results of operational tests by the Joint Doppler Operational Project during 1977 and 1978 illustrate the marked improvement Doppler radar offers for early accurate identification of thunderstorm hazards, especially tornadoes and squall lines. Design characteristics are given for a Doppler radar system, suggested as a next generation weather radar system, to meet the integrated requirements of the NOAA National Weather Service, U.S. Air Force Air Weather Service, and Federal Aviation Administration.

PB80-107204 PC **A06/MF A01**
World Data Center A for Glaciology, Boulder, CO.
Workshop on Snow Cover and Sea Ice Data.
May 79, 112p GD-5, NOAA-79091203

The World Data Center (WDC) arranged a two-day workshop of agency representatives and interested scientists in Boulder, CO., 2-3 November 1978, on The Mapping and Archiving of Data on Snow Cover and Sea Ice Limits. The workshop recommendations and the material presented here are of broad relevance to problems of worldwide concern in the environmental sciences, especially climatology, meteorology, hydrology, and oceanography. This issue contains the workshop recommendations and papers (or summaries).

TID-28821 PC **A03/MF A01**
AIA Research Corp., Washington, DC.
Phase One/Base Data for the Development of Energy Performance Standards for New Buildings. Task Report.
Oct 78, 37p
Contract EX-76-A-29-1020

Work carried out with respect to climatic classification during Phase One of the energy performance standards development process is described. Criteria for the evaluation of climatic classification systems were developed; existing classifications were examined; a classification system for the selection of data collection locations was developed; the classification systems evaluated and alternatives developed during the evaluation process were considered for the presentation of survey findings; a classification system based on a combination of heating and cooling degree days was chosen for the presentation of survey findings; four additional systems (two existing and two developed during the course of the project) were recommended for alternative presentation of the survey findings. Based on the evaluation of climatic classification systems and preliminary analysis of the survey findings, an approach to the development of a final climatic classification system to be used in the implementation of energy performance standards was recommended. (ERA citation 04:046884)

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

AD-A073 839/3 PC **A06/MF A01**
Foreign Technology Div Wright-Patterson AFB OH
The Four Modernizations of China.
21 Feb 79, 103p Rept no. FTD-ID(RS)T-1887-78
Edited trans. of Chung Kuo Szu Ko Hsien Tai Hua (China) p1-32.

No abstract available.

AD-A073 960/7 PC **A09/MF A01**
Naval Postgraduate School Monterey CA
Development and Evaluation of Cross-Impact Analysis as a Crisis Decision-Aid.
Master's thesis,
Ralph L. Schindler. Jun 79, 189p

This thesis reviews the decision-making dilemma caused by information uncertainty and ambiguity produced during crisis situations. Several cross-impact analysis techniques are reviewed and evaluate as possible crisis decision-aids. Cross-event analysis is selected and extended for demonstration in a hypothetical crisis situation involving South Asia. The selected techniques is operationalized and employed in a controlled environment to assess policy response options to the hypothetical crisis. The thesis then assesses the technique's conceptual limitations, and evaluates its utility as a potential crisis decision-aiding methodology. (Author)

AD-A073 966/4 PC **A04/MF A01**
Naval Postgraduate School Monterey CA
Electronic Funds Transfer (EFT) and Its Use in the Navy.
Master's thesis,
Patrick Paul Valenty, Jr. Jun 79, 60p

The application of Electronic Funds Transfer (EFT), a new technology, and its potential use in the U.S Navy is examined. The present payments system is reviewed and found to be performing satisfactorily as far as consumers are concerned. However, business, government and financial institutions see opportunities for reducing costs and improving services, given new technology and changes in banking regulations. The EFT system is described along with the climate for changing the current payment system, suggesting the existence of a fertile base for growth of EFT in the Navy. Accordingly, implementation of EFT at a naval field activity is simulated, showing that significant dollar savings and payee service benefits can be realized. Since consumer acceptance of EFT is vital for its implementation, an analysis is made of a survey given to payees who have accepted EFT. (Author)

AD-A074 015/9 PC **A02/MF A01**
California Univ Berkeley Operations Research Center
On the Candidate Problem with a Random Number of Candidates.
Research rept.,
Cyrus Derman, Gerald J. Lieberman, and Sheldon M. Ross. Aug 79, 14p Rept no. ORC-79-9
Contract N00014-77-C-0299, Grant AFOSR-77-3213
Prepared in cooperation with Columbia Univ., New York. Dept. of Civil Engineering and Engineering Mechanics, and Stanford Univ., CA. Dept. of Operations Research.

In the problem under consideration, a decision maker has a total of M candidates to interview sequentially. The decision maker must either accept or reject the candidate being interviewed after he has been ranked with respect to his predecessors. Once rejected, a candidate cannot be reconsidered; once a candidate is accepted, no futher interviews are carried out. The objective is to select the candidate in such a way as to maximize the probability of choosing the best of all M candidates (assuming every ordering of interviews is equally likely). In this paper, we allow M to be a random variable and determine sufficient conditions on its distribution so as to obtain an optimal policy of simple form. (Author)

AD-A074 288/2 PC **A07/MF A01**
Army Management School Fort Belvoir VA
Methodology Notebook for Action Officers. Part II. 'Vision to Victory.'
Aug 68, 134p

The purpose of this notebook is to complement Part I of the USACDC Methodology Notebook for Action Officers. The notebook is intended to convey a brief but comprehensive portrayal of how operations research is employed in the USACDC Combat Support Group to arrive at scientific solutions to Combat Support problems. It is not intended that it be a panacea for all problems, nor that it be used as a Standing Operating Procedure. Rather, it presents the policies, suggested methods of operation, organizational details, and tasks that are available to CSG action officers while it highlights the ways and means for these assets to be used in a scientific manner. Research within CSG is applied -- not pure -- research. As such, it must be conducted with a view toward the scientific determination or identification of tangible end products -- products that will be of scientifically proven benefit to the Army of the future. The material presented in this notebook is designed to provide USACDCCSG and assigned agency action officers with the basic fundamentals needed to perform CSG applied research.

AD-A074 374/0 PC **A08/MF A01**
Air Force Inst of Tech Wright-Patterson AFB OH School of Systems and Logistics
Organizational Change Patterns in the Air Force System Program Office.
Master's thesis,
Daniel V. Connors, and Dennis M. Maloney. Jun 79, 155p Rept no. AFIT-LSSR-3-79A

This research attempted to analyze and integrate the work of several previous thesis teams into a definitive model which will explain the causal relationships among nine organizational variables (program phase, organization size, tenure, level of bureaucracy, organizational climate, role conflict, role ambiguity, role stress, and conflict intensity) as the Air Force System Program Office progresses through its life cycle. The statistical technique to be employed was cross-lagged analysis, a technique designed for use in longitudinal research. However, upon examination of the raw data provided by each team, they were found to be incompatible for use in cross-lagged analysis. The research effort was then altered to (1) adapt the data to a form useable in cross-lagged analysis, (2) demonstrate the use of the technique in analyzing organization variables, and (3) delineate required events for the successful use of cross-lagged analysis in the study of the variables in question.

PB80-100118 PC **A05/MF A01**
Small Business Administration, Washington, DC. Office of Management and Research Assistance.
Creer et Gerer une Petite Entreprise Commerciale (Starting and Managing a Small Business of Your Own),
Wendell O. Metcalf. 1962, 87p

Text in French. See also English version, PB-282 705. Sponsored in part by Agency for International Development, Washington, DC.

In this translation of an English publication titled 'Starting and Managing a Small Business of Your Own', are the factors, that influence to a large extent the success or failure of a small business, considered. Personality traits, type of enterprise, financing, sole-ownership vs. joint-proprietorship, location, price determination, salesmanship, personnel, laws, patents as well as the expected success rate, are analyzed with the aid of graphs and tables. A questionnaire, giving the most important points to consider, as well as a chart showing what avenues to explore to remain up to date, are included.

PB80-101223 PC **A04**/MF **A01**
Public Technology, Inc., Washington, DC.
Considerations in Providing Services Directly or By Contract: An Information Bulletin of the Management, Finance and Personnel Task Force of the Urban Consortium,
J. Parker. 1977, 56p NSF/RA-770867, HUD/PDR-283/5
Grant NSF-ISP75-21491

The report is one of five information bulletins developed by the Urban Consortium, a coalition of 34 major urban governments working together with Federal officials and private industry to encourage the development and transfer of products and systems addressing urban needs. The report recognizes that many services provided by urban city and county governments are available for contractual purchase from the private sector. Criteria are offered for making the decision whether to provide the service with in-house forces, whether to contract the service in its entirety, or whether to consider a combination of both. For those having made the decision to contract, there is a brief section on the steps necessary to effect the contract. An extensive catalogue of resource persons experienced in contracting for particular services was viewed as useful to its colleagues by the Task Force.

PB80-101231 PC **A03**/MF **A01**
Public Technology, Inc., Washington, DC.
A Process for Revenue and Expenditure Forecasting in Local Government: An Information Bulletin of the Management, Finance and Personnel Task Force of the Urban Consortium,
J. Parker. 1977, 28p NSF/RA-770869, HUD/PDR-283/2
Grant NSF-ISP75-21491

This is one of five information bulletins developed by the Urban Consortium, a coalition of 34 major, urban governments working together with federal officials and private industry to encourage the development and transfer of products and systems addressing urban needs. Task forces are used to systematically identify the common needs of its members, establish priorities, develop research and development agenda, and stimulate research and development priorities. This report reviews forecasting techniques which are available to local governments for projecting their revenues and expenditures. A survey summary presents the systems that the majority of the jurisdictions contacted are currently using for forecasting, how satisfactory the present methods appear, and what, if any improvements are planned. The report is of interest to elected officials, chief administrative officials, and financial administrators in local governments. Federal agencies which are developing their research programs on this topic will be interested in having indications of the quality of forecasting systems presently being used.

PB80-101447 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Assessment of Allegations Involving the Environmental Protection Agency's Kansas City Regional Office.
19 Oct 79, 50p CED-80-17

Widespread mismanagement of the procurement and personnel functions at the regional office did not occur. The regional administrator was involved in a few procurement and personnel actions some of which were not processed in accordance with regulations or procedures or gave the appearance of favoritism to former associates. Morale problems exist. Environmental Protection Agency headquarters contributed to these problems by appointing an individual with a limited administrative and managerial background and then did not provide needed direction and support in administrative matters. EPA's evaluations of the allegations were not properly focused and coordinated and left many questions unanswered.

PB80-102437 PC **A09**/MF **A01**
New York Inst. of Tech., Old Westbury.
Technology Transfer: A Primer on Problems,
Herbert Fox. Sep 72, 194p NSF/RA/G-72/061
Grant NSF-GT-33083

Results of the Second Annual Urban Technology Conference on utilization of high technology in the urban sector are reported. This workshop provided a detailed examination by technologists and local government officials of hardware and software of common interest to many cities. The problem areas selected were: cable television, computer planning, energy generation, management and implementation, conversion and distribution, fire-resistant materials in building construction, health and medical care delivery systems, law enforcement, liquid waste management, management sciences, municipal vehicle design, and solid waste management. In separate task forces, each area was defined, and a detailed statement developed with respect to technology-intensive and policy-intensive considerations and inhibitors to the technology transfer process. These problem statements, coupled with taped panel discussions, form the basis for this report.

PB80-103435 PC **A13**/MF **A01**
Oklahoma State Dept. of Economic and Community Affairs, Oklahoma City.
Oklahoma State Science, Engineering and Technology Advisory Program: Part I: Issues and Needs, Part II: Resource Personnel, Part III: Policy and Structure.
Final rept. 1 Oct 77-30 Sep 78.
1978, 277p NSF/RA-780659
Grant NSF-ISP77-25875

The report identifies and analyzes potentially effective ways in which the Executive Branch of the Oklahoma State Government could use science, engineering, and technology (SET) in its policy formulation process. Recommendations for the Governor as to an appropriate mechanism for the provision of such information on a continuing basis are developed. The study comprises: a survey of issues and needs of state policy makers for SET information; a survey of SET resource personnel in Oklahoma; and development of policy and structure for an appropriate SET advisory program. The latter includes analyses of survey results and investigation of potential organizational formats and bases. Extensive screening and evaluations have resulted in the final recommendation that the proposed program be located in the State of Oklahoma Department of Economic and Community Affairs.

PB80-103526 PC **A03**/MF **A01**
Public Technology, Inc., Washington, DC.
A Process for Local Government R and D Needs Identification and Priority-Setting, Resource Document.
1979, 33p NSF/RA-790190
Grant NSF-ISP76-11055

The handbook is designed as a how-to-do-it guide for identifying and setting priorities for R&D needs of urban jurisdictions. Target audiences include the Urban Consortium, other technology transfer networks serving local governments, individual state and local governments, Federal agencies, and the general research community dealing with urban concerns, e.g., the Community Technology Initiatives Program and Innovation Groups. An explanation of the organizational structure of the Urban Consortium is followed by five instructional sections replete with graphs, figures, forms, and explanatory text. These delineate needs identification process, needs priority-setting process, updating the needs and priorities, problem solution, and lessons from experience. An appendix contains a needs survey package and blank forms.

PB80-104102 PC **A07**/MF **A01**
Innovative Systems Research, Inc., Pennsauken, NJ.
Program to Conduct Ongoing Observations of Federally Premeditated Actions to Accelerate Utilization of Civilian Oriented Research and Development.
Final rept.
31 May 78, 150p NSF/RA-780669
Grant NSF-ISP74-23241

The study is designed to provide Federal Program Managers with a methodology for choosing among alternative incentive strategies most appropriate to facilitate civilian oriented utilization of research and development (R & D). The methodology employs distinctive characteristics of incentives and barriers identified in past projects. Three models were developed to simulate the innovation process and implemented with a data base of 33 projects. Findings are discussed with respect to characteristics of incentives by nine types, barrier analysis, incentives under R & D projects grouped by barriers, and the interim components of a success model.

PB80-104136 PC **A04**/MF **A01**
Virginia Dept. of Intergovernmental Affairs, Richmond.
State Science, Engineering and Technology Capacity in Virginia State Government.
Final rept.,
Crichton J. Armstrong. Dec 78, 59p NSF/RA-780657
Grant NSF-ISP77-25885

A four-phased process is described to identify the needs for science, engineering, and technology (SET) within state government decision making in Virginia, and to develop recommendations for meeting these needs. The report identifies resources within and outside the State of Virginia which might be applied to problems requiring scientific expertise. Basic areas of pure research, research applications, policy advice, and futures assessment are considered with emphasis on the latter two subjects. Of three types of governmental decisions identified as having potential need for SET information, the report focuses primarily on decisions taken at the policy and program management levels. Included are findings and recommendations. Appendices contain a survey and summary of other states, a survey of Virginia's needs, study methodology, and the implementation plan.

PB80-106529 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Procurement and Systems Acquisition Div.
GSA's Personal Property Repair and Rehabilitation Program: A Potential for Fraud.
Report to the Congress.
14 Nov 79, 36p PSAD-80-5

The General Services Administration (GSA) does not have enough controls to ensure that repair services are provided in accordance with contract terms. The program lacks effective management, many contractor accounting systems are inadequate for accumulating and reporting costs, and agency compliance with repair schedule provisions is poor. GSA should improve its management of the program or reduce it to a more manageable size. GSA also should be more responsive for administering the program and assisting customer agencies.

UCRL-82007 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Commercialization of Technology Through the Federal Laboratory Consortium for Technology Transfer.
C. F. Miller. 7 Dec 78, 8p CONF-781216-1
Contract W-7405-ENG-48
ACS symposium series, Miami Beach, FL, USA, 12 Dec 1978.

The Federal Laboratory Consortium for Technology Transfer is an active, growing organization of R and D laboratories and centers (about 180) whose members are committed to efforts to speed the flow of R and D results from the Laboratory to the marketplace. The FLC members seem to function most effectively as brokers, serving as face-to-

face contact points between the technology resources and the users. Some successful transfers have taken place, and new approaches to technology transfer and commercialization are being investigated. Examples given of FLC commercialization activities are the tube earphone and microphone unit commercialization; lightweight body armor; spinoff transfer and commercialization of laser technology; program to fully utilize technical information and expertise. (ERA citation 04:050165)

5B. Documentation and Information Technology

AD-A073 999/5 PC **A03**/MF **A01**
Office of Naval Research London (England)
European Scientific Notes. Volume 33, Number 2,
Aubrey W. Pryce, and Victoria S. Hewitson. 28 Feb 79, 49p Rept no. ESN-33-2

This is a monthly publication presenting brief articles concerning recent development in European Scientific Research. It is hoped that these articles (which do not constitute part of the scientific literature) may prove of value to American scientists by disclosing interesting information well in advance of the usual scientific publications. The articles are written primarily by members of the staff of ONRL and occasionally articles are prepared by, or in cooperation with, members of the scientific staffs of the United States Air Force's European Office of Aerospace Research and Development and the United States Army Research and Standardization Group. Articles are also contributed by visiting Stateside scientists. (Author)

AD-A074 081/1 PC **A05**/MF **A01**
Planning Research Corp McLean VA
Inverted File Facility User's Guide.
Final rept.,
S. Tamberrino. 31 Aug 77, 97p Rept no. PRC-706-22
Contract DCA100-73-C-0015

The Inverted File Facility (INVFF) is an extension of the Indexed Sequential Processor (ISP) which allows the user to build, retrieve from, and update inverted data bases. In addition to the ISP's data file and index file, the INVFF uses an inverted index file which provides the following additional file processing capabilities: (1) the ability to distinguish each data record as being a specific type and (2) the ability to process data records randomly through the specification of values contained within a record. (Author)

AD-A074 240/3 PC **A10**/MF **A01**
Texas Tech Univ Lubbock
Vigilance: An Annotated Bibliography,
Charles G. Halcomb, and Peggy J. Blackwell. Nov 69, 206p
Contract DAAD05-69-C-0102

Vigilance, or monitoring behavior, has been an area of interest to researchers since World War II. Research activity has not only continued over the past 25 years, but has increased at an ever progressing rate. This bibliography was compiled to meet the need for a continuing program of research into the problem associated with recovery from the classical vigilance decrement, and is presented with annotations in the hope that it will be of value to investigators in the field. It is possible that some articles have been overlooked, although every attempt was made to make this bibliography complete. (Author)

AD-A074 289/0 PC **A06**/MF **A01**
Human Engineering Lab Aberdeen Proving Ground MD
Milestones: A Directory of Human Engineering Laboratories Publications, 1953 - 1968.
Apr 69, 114p

MILESTONES is a cross-referenced directory of reports that the U. S. Army Human Engineering Laboratories have published since their founding in 1953. It is compiled and re-issued each year to provide an up-to-date index for the convenience of other people and organizations working in the human factors engineering field. To allow most effective access to a rather extensive body of knowledge in many specific areas, MILESTONES comprises three volumes or sections. These sections are coded through printing them on colored paper.

AD-A074 299/9 PC **A05**/MF **A01**
Operations Research Inc Silver Spring MD
Development of a Quality Assurance Methodology for the Technical Information Generation Subsystem of NTIPS.
Final rept. Apr-Dec 78,
Don D. Deardorff, Kenneth C. Hageman, Wilburn Hehs, and James M. Norton. Mar 79, 100p
Contract N00019-78-C-0175
Prepared in cooperation with Hageman, Inc., Fort Worth, TX.

Volume I of this report provides: (1) a brief description of current Technical Publications development and Quality Assurance programs, (2) a description of NTIPS (Navy Technical Information Presentation System), (3) a detailed discussion of the content generation phase of NTIPS, and (4) a detailed discussion of a Quality Assurance program designed for contractor implementation during the contract generation phase. Volume II of the report is a draft Quality Assurance Specification for Technical Publications and supporting Data Item Descriptions (DID's). (Author)

AD-A074 317/9 PC **A03**/MF **A01**
Office of Naval Research London (England)
European Scientific Notes,
Irving Kaufman, and Victoria S. Hewitson. 30 Jun 79, 49p Rept no. ESN-33-6

This is a monthly publication presenting brief articles concerning recent developments in European Scientific Research. It is hoped that these articles (which do not constitute part of the scientific literature) may prove of value to American scientists by calling attention to current developments and to institutions and individuals engaged in these scientific efforts. The articles are written primarily by members of the staff of ONRL and occasionally articles are prepared by, or in cooperation with, members of the scientific staffs of the United States Air Force's European Office of Aerospace Research and Development and the United States Army Research and Standardization Group. Articles are also contributed by visiting Stateside scientists. (Author)

DOE/TIC-4582-R14 PC **A08**/MF **A01**
Department of Energy, Washington, DC.
Technical Books and Monographs. 1979 Catalog.
1978, 172p

This publication is a bibliography of books and monographs sponsored by the U.S. Department of Energy (DOE) and by the earlier organizations that were brought together to form DOE. In general, information for each published book, and for each book in press when known, includes title, author, and author affiliation, publisher and publication date, page count, size of book, price, availability information if the book is not available from the publisher, Library of Congress card number (LC) (with CIP to indicate books that have cataloging information in the publication), International Standard Book Number (ISBN), a brief descriptive statement concerning the book, and (for the more recent books) a list or a description of the contents. The books and monographs are grouped under thirteen subject categories. At the end of each subject category are separate sections listing recently published symposium proceedings and bibliographies that received support from DOE or one of the earlier organizations. Also, at the end of the catalog are described the following DOE publications: Energy Research Abstracts, Energy Abstracts for Policy Analysis, Energy Conservation Update, Fossil Energy Update, Fusion Energy Update, Geothermal Energy Update, Solar Energy Update, and Nuclear Safety. (ERA citation 04:050914)

ED-167 108 Not available NTIS
New York State Coll. of Agriculture and Life Sciences, Ithaca.
Creating Agricultural Communication Centers for Training, Research, and Information Services.
Rept. no. 6,
William B. Ward. Sep 74, 25p
For related documents, see IR-006 846-851 and ED-162 648. Portions of this document are not fully legible.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$1.67, MF$0.83 Plus Postage. Also available from The Communication Arts Graduate Teaching and Research Center, Cornell Univ., 640 Stewart Avenue, Ithaca, NY. 14853 (single copies are free).

Several of the new agricultural universities in India have identified a special need to improve their communication capabilities through the better use of the mass media and other channels to narrow the communication gap between agricultural scientists, educators, and farmers. This paper discusses the basic concept, goals, administration, organization, and future of the Communication Centers recently established by two of these universities in their efforts to speed up agricultural and rural development and build stronger institutions. The appendices include organizational and function charts of the two centers as part of their university systems.

ED-167 127 Not available NTIS
National Commission on Libraries and Information Science, Washington, DC.
National Commission on Libraries and Information Science. Annual Report to the President and Congress, 1976-1977.
28 Apr 78, 106p
For related documents, see ED-107 312, ED-135 350, ED-138 252-253, ED-140 799, and ED-148 342.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$6.01, MF$0.83 Plus Postage. Also available from Supt. of Docs.

This sixth annual report of the National Commission on Libraries and Information Science (NCLIS) covers the 15-month period between July 1, 1976 and September 30, 1977. Activities reported include preparation for the White House Conference on Library and Information Services (Public Law 93-568) as well as the ongoing implementation of the Commission's National Program. Final reports were obtained from three studies undertaken earlier: Inventory of Library Needs--1975; Evaluation of the Effectiveness of Federal Funding of Public Libraries; and Library Photocopying in the United States. The Task Force on a National Periodicals System completed its work with a report; Effective Access to the Periodical Literature, and three more task forces were constituted to work computer protocols, standards in the library and documentation fields, and the role of the school library/media center in the National Program. Continuing activities included support for the Committee for the Coordination of National Bibliographic Control; communication, coordination, and cooperation with other government agencies and the professional community; and keeping abreast of developments in the area of copyright. All of these activities, and others, as well as plans for the future and recommendations for the following year, are discussed in this report.

ED-167 128 Not available NTIS
National Commission on Libraries and Information Science, Washington, DC.
Toward a National Program for Library and Information Services: Goals for Action. A Summary.
Oct 77, 15p
For related document, see ED-107 312.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$1.67, MF$0.83 Plus Postage.

This summary of the deliberations and prosposals of the National Commission on Libraries and Information Science includes brief discussions of programs goals, a needs analysis, and the concerns of both libraries and the private sector. Recommendations for a national program are presented as eight priority objectives, and various facets of the nationwide network concept are discussed--major federal responsibilities; organizational relationships and supporting responsibilities; responsibilities of state governments, the private sector,

and the Library of Congress; proposed legislation; and funding. The full report, which was published in 1975, is also available through ERIC (see related document).

ED-167 129 Not available NTIS
Illinois Univ., Champaign. Graduate School of Library Science.
Children's Services of Public Libraries,
Selma K. Richardson. 1978, 171p
Papers presented at the Allerton Park Inst., 23rd, Monticello, IL, November 13-16, 1977.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, MF$0.83 Only, Plus Postage. Also available from Publications Office, Graduate School of Library Science, 249 Armory Building, Champaign, IL. 61820 ($9.00).

This collection of papers provides an overview of the status of children's services in public libraries and identifies areas which need to be strengthened. A review of the institute program and an examination of the goals of children's services are followed by 16 papers focusing on the child, the children's librarian, services, facilities, materials, and research. Four final papers present the view of four participants as they reacted to the program from the perspectives of a recent library school graduate, a retired leader in the field, a school librarian, and a library administrator. A list of acronyms and a subject index are included.

ED-167 130 Not available NTIS
Wayne State Univ., Detroit, MI. Univ. Libraries.
Report on Visual Display at Purdy Library.
Technical paper no. 9,
Ronald Allen. Mar 78, 18p
Portions of this document are not fully legible.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$1.67, MF$0.83 Plus Postage.

The findings of a study conducted to evaluate the effectiveness of a visual display illustrating use of the card catalog in a university library are presented. The evaluation focused on the major goal of the display, which was to provide new information to library users. A questionnaire designed to measure a respondent's knowledge of the various aspects of the card catalog presented on the 12 posters was distributed to library patrons and four classes in the sociology and psychology departments a week before the display, three weeks after its removal, and a year later. Findings indicate that 57 percent of the library users looked at the display, as did 30 percent of the class members, with all that looked having a higher percentage of wrong answers as well as a higher percentage of correct ones. The increase in user knowledge after reading the posters was negated by a corresponding increase in incorrect knowledge about the card catalog. Conclusions suggest emphasis on directional rather than instructional aids, with library instruction being viewed as the most effective way to impart information about library resources and their use.

ED-167 131 Not available NTIS
Bloomsburg State Coll., PA.
College Library Instruction/College Instruction: A Review of the Literature,
William J. Frost. Oct 78, 27p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$2.06, MF$0.83 Plus Postage.

This review of 64 recent works concerning research in library instruction at the college level attempts to place this research in the larger context of learning outcomes and instructional approaches for undergraduates teaching in general. A live lecturer presenting subject overviews to large audiences, small student-centered discussion groups, and varied instructional media will enhance achievement levels of students being taught to use college libraries. Behavioral objectives might be used to improve achievement in library learning although it is less certain how they might improve instruction and the evaluation of learning. There is slight evidence to support inferences regarding cognitive knowledge retention, and none regarding the transfer of knowledge from use of one library tool to another. Sufficient information about the transfer of theoretical textbook knowledge to practical in-library use is also lacking. In-house media have been reported efficient only on a long term basis; therefore, library instruction programs, especially experimental ones, could benefit from use of commercially produced media for learning standard tools.

ED-167 132 Not available NTIS
State Univ. of New York, Albany. Univ. Libraries.
Annual Report of the University Libraries, June 1, 1976-May 31, 1977.
1977, 18p
For related document, see ED-144 556.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$1.67, MF$0.83 Plus Postage.

After comparing 1976/77 statistics for library acquisitions, services, and administration personnel with those for 1975/76, the document presents lists, arranged alphabetically by the names of the librarians involved, of the following kinds of information: committee memberships and elective offices held in professional organizations; presentations given; publications; courses taught; university and community services rendered; and awards received.

ED-167 133 Not available NTIS
California Univ., Santa Barbara. Univ. Library.
Library Skills: A Self-Paced Workbook,
Patricia Gebhard, and Barbara Silver. Aug 78, 113p
For related document, see IR-006 891.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$6.01, MF$0.83 Plus Postage.

This workbook is the text for a self-paced, programmed one-unit course which teaches about library resources and their use at the University of California Santa Barbara Library, a medium-sized academic university research library. It provides freshmen and incoming students with the basic information they need to know in order to use the library: (1) the kinds of services and library materials available and how to find them; (2) tools for access to these materials--catalogs, serials list, indexes and bibliographies--and techniques for using these tools; and (3) standard reference works--dictionaries, encyclopedias, biographies, criticism, plot summaries; and government documents. Topics are presented in 21 chapters with questions and operations which are to be performed in the library; five options are given so that use of the tools is split up among drawers or volumes. Evaluation has indicated the success of the course, both in instructing the students and, perhaps of more importance for entering students, changing their attitude from apprehension when facing a complex library to the feeling of confidence which comes from knowing how to find materials and from whom to request assistance.

ED-167 134 Not available NTIS
California Univ., Santa Barbara. Univ. Library.
Library Research: A Beginning Text in Bibliographic Searching.
Patricia Gebhard. 1976, 137p
Portions of this document are not fully legible.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$7.35, MF$0.83 Plus Postage.

This manual is the textbook for a two-unit course for upper division students at a middle-sized university academic research library, the University of California Santa Barbara Library. The book introduces search strategy for finding information for a term paper. After discussing factual information about library collections, classification, card catalogs, and filing, the book presents search strategy to the students, including use of encyclopedias and dictionaries, finding book materials, finding current materials by identifying indexes and abstracts and learning their use, finding and using bibliographies, and evaluating materials located. The accompanying assignments require students to go through this search strategy step by step. In this way, they experience various techniques upon which to base decisions for searching for information in the future. The course is designed to develop the students' critical thinking and problem-solving skills in finding their way through the complexities of the contemporary academic research library or any library they might use in the future.

ED-167 135 Not available NTIS
New York State Dept. of Education, Albany. Office of Postsecondary Research, Information Systems, and Institutional Aid.
Higher Education Data System: A Source of Basic Data on New York State Degree-Granting Institutions.
Sep 77, 50p
For related document, see ED-132 901.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$2.06, MF$0.83 Plus Postage.

Data in this computer-based information system are taken from reports provided to the New York State Education Department by degree and certificate awarding institutions through the annual data collection program. The reporting instruments used are the Federal Higher Education General Information Survey (HEGIS) and the State Education Department Higher Education Data System (HEDS) forms. The software of the HEDS system allows retrieval of data in a number of levels of detail, accommodates a variety of mathematical manipulations, and provides considerable flexibility in output formats; examples of the HEDS retrieval and format capabilities are included in this report. Data categories and data elements are selected on the basis of their importance and usefulness for research and planning purposes. HEDS currently contains 147 data elements and subtotals in 12 major categories--institutional characteristics, undergraduate admissions/applications, graduate admissions/applications, undergraduate enrollment, graduate enrollment, basic student charges, degrees and formal awards conferred, faculty/staff, full-time faculty--salaries and tenure, institutional finance, physical facilities, and residence and migration. While the size of the system has been kept small at the outset, it can be expanded or modified in the future as problems arise requiring resolution or change and as capabilities for analysis increase.

ED-167 136 Not available NTIS
Monash Univ., Clayton (Australia).
Community Information Services. A Case Study Based on the Dandenong Valley Regional Library Service,
Magdalena Filar-Tarlerski. 28 Oct 77, 60p
A workshop for public librarians. Portions of this document are not fully legible.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, MF$0.83 Only, Plus Postage.

This preliminary study of the region and its population, which was conducted in order to determine the best methods for the distribution of information, is based largely on 1971 census data and will require review and further analysis when the 1976 census data are available. A brief description of the region and the characteristics of the local government areas--three cities and two shires--is followed by discussions of the demographic factors surveyed: population growth, age--structure and distribution, marital status, religion, workforce participation, birthplace of population, major occupational categories, education, housing, and household formation. The discussion of each factor is keyed to a table displaying statistical data. Trends in information needs are discussed, and brief descriptions are provided of information agencies operating in the area as well as developments in cooperation and coordination among various community groups. Included in the report are three papers on related topics: community information data collection, organization and retrieval of this data, and the delivery of information to the community.

ED-167 137 Not available NTIS
Colorado State Library, Denver.
Colorado Library Network Plan. A Network for Sharing,
Virginia Boucher. 2 Jun 77, 67p

Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$3.50, MF$0.83 Plus Postage. Also available from Colorado State Library, 1362 Lincoln Street, Denver, CO. 80203 ($2.00).

A brief history of library development in Colorado is followed by the outline of a plan which delineates four network programs: materials selection, interlibrary loan, reference/information, and communications. Though these programs are interrelated in numerous ways, they are considered here one by one. For each program, the purpose and need, the current status, and the tasks needed for development are discussed. Following each discussion is a summary chart listing objectives, tasks, and a variety of considerations for each task. The cooperative roles to be played by the different libraries and agencies in Colorado are described, as well as the administration and governance of the network. A glossary of acronyms and initialisms, a brief bibliography, and two pages of definitions are included.

ED-167 138 Not available NTIS
National Commission on Libraries and Information Science, Washington, DC.
Our Nation's Libraries: An Inventory of Resources and Needs.
1978, 18p
Portions of this document are not fully legible.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$1.67, MF$0.83 Plus Postage. Also available from Supt. of Docs.

This inventory of the resources and needs of the nation's public libraries, academic libraries, and public school library media centers presents an improverished picture: these libraries are grossly underfunded. As a result they lack the staff, materials, space, and hours of service to meet citizens' needs. To bring the libraries up to minimum levels of service will require a one-time expenditure of $12 billion for books and other materials and an increase of $6 billion a year for operating budgets (based on 1974 costs). These conclusions are supported by charts showing the deficiencies in professional staff; books, print, and microform materials; nonprint materials; and annual operating budgets. Problems associated with the number of libraries, staff, materials, space, hours of service, and expenditures are briefly discussed for each type of library.

ED-167 170 Not available NTIS
Intercultural Communication: A Bibliography of ERIC Documents.
Randall D. Erickson. Jul 78, 116p
Portions of this document are not fully legible.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, MF$0.83 Only, Plus Postage.

This bibliography consists of documents in the ERIC system which deal, in total or in part, with the topics of intercultural communication, which is defined as the communication of two people or a group of people across cultural barriers either within one nation or between members of two nations. Documents included address theoretical or practical aspects. It is not meant to be a comprehensive listing of all ERIC documents on the subject, but an attempt was made to include all documents which address the subject in a substantial manner. The search which produced this document was done on Orbit IV during the months of June and July 1978.

ED-167 171 Not available NTIS
Library of Congress, Washington, DC. Congressional Research Service.
The Legislator as User of Information Technology.
Robert I. Chartrand. 9 Oct 77, 37p
Portions of this document are not fully legible.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$2.06, MF$0.83 Plus Postage.

The multiple role of the government legislator necessitates the constant evaluation of relevant and diverse information for effective decision-making, and requests for direct access of information have resulted in the use of video screen terminals and online computer services. Computerized bibliographic files augment traditional information support by executive branch subject specialists and libraries. Congressional support of the coordinated development of technology-supported information systems has resulted in legislative branch information resources covering many aspects of governmental decision-making. State legislators have information needs similar to those of Congress; they could also benefit from an increased use of computer technologies. Advantages and disadvantages of applying computer technology to identifiable legislative activities must be considered when developing new information services. However, the effectiveness and responsiveness of any such information system will depend basically upon the managerial competence and political astuteness of those who establish the policy and procedures governing its operation.

ED-167 175 Not available NTIS
North Carolina State Dept. of Public Instruction, Raleigh. Div. of Educational Media.
Advisory List of Instructional Media for Biography.
1978, 24p
For related document, see ED-149 742.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$1.67, MF$0.83 Plus Postage.

Books classified as biography in the school media collection for grade levels primary through senior high school are included in this advisory list. Selections were made from books which publishers submitted for evaluation; only those which were favorably reviewed by educators are listed. An unannotated list of books receiving favorable notices in the indicated reviewing sources is attached. Each entry level includes citation, price if available, grade level, and annotation. For additional materials, see the 1977 Advisory List.

ED-167 176 Not available NTIS
North Carolina State Dept. of Public Instruction, Raleigh. Div. of Educational Media.
Advisory List of Instructional Media for Cultural Arts.
1978, 11p
For related document, see ED-149 743.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$1.67, MF$0.83 Plus Postage.

Instructional media appropriate for school cultural arts programs are listed in this advisory list by type of media: books, films, filmstrips, recordings, or slide sets. Entries in the list were selected from those materials submitted by publishers which received favorable reviews by educators. Materials range from primary to senior high school grades. Each entry includes citation, price if available, grade level, and annotation. For additional materials, see the 1977 Advisory List.

HRP-0028588/2 Not Available NTIS
Sort DP Proposals With This Input/Output Cost Matrix.
David Reps. 1977, 10p
Pub. in Hospital Financial Management v31 n1 p31, 34-35, 38-44 Jan 77.

To implement a hospital-wide computer system, one hospital devised a useful methodology using a schedule and a system to coordinate the various aspects involved in making the necessary studies, obtaining the bids, and evaluating the bids received. The schedule involved eight steps: formalize the goals and approve a study plan (1 week); determine the system priorities (2 weeks); develop alternative implementation modes (3 weeks); develop requests for vendors' proposals (8 weeks); communicate with vendors (4 weeks); review and evaluate vendors' proposals (6 weeks); make decisions (5 weeks); and negotiate the contracts (3 weeks). The entire process (with much overlapping of sequences) was scheduled to consume about 22 weeks. After the proposals were received, they had to be compared. Since they were not exactly comparable, the hospital drew up an evaluation form for the individual bids which would include the systems that the hospital wanted, what the vendor had proposed, and the cost. Then a final evaluation form was drawn up onto which were transferred all the pertinent information from each individual vendor. This final form allowed a review and evaluation of all proposals on one form. By using such a matrix, a hospital can help its financial officer to be objective when deciding on a computerized system. computerize.

LBL-8720 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Knowledge Based System for Providing Intelligent Access to a Petroleum User Database.
S. Rosenberg. Jan 79, 7p
Contract W-7405-ENG-48

This paper describes the design of a knowledge-based system for handling information concerning petroleum usage in the United States. The FRL language is used. Information is organized around the categories site, area, and company. (ERA citation 04:048117)

NTISUB/E/279-017 PC **E08**/MF **A01**
Central Intelligence Agency, Washington, DC.
Directory of Officials of the Hungarian People's Republic; a Reference Aid.
Oct 79, 181p CR-79/15804
Paper copy available on Standing Order, Deposit Account required. North American Continent price based on page count of individual documents; all others write for quote. This series offers an approximate 20% reduction in price as a Standing Order.

The directory is a functional reference guide to officials of the Hungarian Government, the Hungarian Socialist Workers' Party, and other prominent public organizations.

NUREG-0540-V-1-8 PC **A23**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Technical Information and Document Control.
Title List of Documents Made Publicly Available, August 1-31, 1979.
Oct 79, 540p
See also NUREG-0540-V-1-7.

The document is a monthly publication containing descriptions of information received and generated by the U.S. NRC. This information includes (1) docketed material associated with civilian nuclear power plants and other uses of radioactive materials and (2) nondocketed material received and generated by NRC pertinent to its role as a regulatory agency. The docketed information includes information formerly issued through U.S. DOE's Technical Information Center under the title Power Reactor Docket Information (PRDI). This document replaces PRDI, which will no longer be prepared. It is indexed by a Personal Author Index, Corporate Source Index, and Report Number Index.

NUREG-0540-V-1-9 PC **A20**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Technical Information and Document Control.
Title List of Documents Made Publicly Available, September 1-30, 1979. Volume 1, Number 9.
Nov 79, 457p
See also Volume 1, Number 8, NUREG-0540-V-1-8.

The document is a monthly publication containing descriptions of information received and generated by the U.S. NRC. This information includes (1) docketed material associated with civilian nuclear power plants and other uses of radioactive materials and (2) nondocketed material received and generated by NRC pertinent to its role as a regulatory agency. The docketed information includes information formerly issued through U.S. DOE's Technical Information Center under the title Power Reactor Docket Information (PRDI). This document replaces PRDI, which will no longer be prepared. IT is indexed by a Personal Author Index, Corporate Source Index, U.S. NRC Organizational Source Index and Report Number Index.

N79-32125/3 PC **E04**
National Aeronautics and Space Administration, Washington, DC.
Nasa Patent Abstracts Bibliography, a Continuing Bibliography. Section 1: Abstracts.
Jul 79, 88p NASA-SP-7039(15)-Sect. 1

Abstracts are cited for 240 patents and applications for patents introduced into the NASA scientific system during the period of January 1979 through June 1979. Each entry consists of a citation, an abstract, and in most cases, a key illustration selected from the patent or application for patent.

N79-32126/1 PC **E06**
National Aeronautics and Space Administration, Washington, DC.
Nasa Patent Abstracts Bibliography, a Continuing Bibliography. Section 2: Indexes.
Jul 79, 635p NASA-SP-7039(15)-Sect. 2

Entries for 3632 patents and patent applications for patent citations for the period May 1969 through 1979 are listed. Indexes for subject, invention, source, number, and accession number are included.

PB80-100449 PC **A04**/MF **A01**
Midwest Research Inst., Kansas City, MO.
Fine Particle Emissions Information System.
Annual rept. Jan-Dec 78,
M. P. Schrag, J. P. Reider, and F. N. Young. May 79, 53p EPA/600/7-79/126
Contract EPA-68-02-2641
See also PB-285 877.

The report is the first annual report on the Fine Particle Emissions Information Systems (FPEIS), a computerized data base on primary fine particle emissions from stationary sources. The report summarizes changes made in 1978, including the expanded reporting of chemical analysis data, the entering of confidential or proprietary data, and the development of computer software to aid users in interpreting the FPEIS data. It lists new data added to the FPEIS in 1978 and outlines objectives for 1979, including the addition of biological and radiological analysis results and the implementation of a new source categorization protocol. The FPEIS provides a centralized inventory of fine particle measurement information for researchers engaged in fine particle control technology development and in the environmental assessment of energy and industrial processes. From an initial data loading for about 50 test sites in January 1977, the FPEIS program had grown to 120 test sites and almost 2000 sampling runs by the end of December 1978.

PB80-101421 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Logistics and Communications Div.
Continuing Problems in DOD's Classification of National Security Information.
Report to the Congress.
26 Oct 79, 46p LCD-80-16

Some individuals at DOD did not comply with the provisions of the 1978 Executive order and DOD's regulation on the classification of national security information. As a result, there was improper use of classification authority, improper classification of information, and deficiencies in the marking of classified information. To correct these conditions, DOD should expand the training given to classifiers and improve its independent inspections of classification activities.

PB80-103054 PC **A07**/MF **A01**
Association for the Study of Man-Environment Relations, Inc., Orangeburg, NY.
Feasibility Study on Improving Access to Information about the Impact of the Built Environment on the Health and Lives of People: Final Report,
D. Michael Murtha. 25 May 79, 149p
Contract DHEW-278-77-0055
See also Appendix I-V, PB80-103062. Sponsored in part by Department of Housing and Urban Development, Washington, DC.
Also available in set of 3 reports PC E12, PB80-103047.

Three major tasks were addressed in this study: (1) to comprehensively define the nature of the information access problem; (2) to identify and define the aspects of the existing situation that served as constraints the development of improved access systems; and, (3) to utilize the results from the two previous efforts in a comprehensive analysis and development of recommended systems that should provide feasible solutions to the present and potential information access problem.

PB80-103062 PC **A11**/MF **A01**
Association for the Study of Man-Environment Relations, Inc., Orangeburg, NY.
Feasibility Study on Improving Access to Information about the Impact of the Built Environment on the Health and Lives of People: Project References, Appendix I-V,
D. Michael Murtha,. 25 May 79, 231p
Contract DHEW-278-77-0055
See also Final rept., PB80-103054 and Appendix VI-IX, PB80-103070.
Also available in set of 3 reports PC E12, PB80-103047.

The appendices provide back-up reference material for the Final Report. Appendices included in this volume are: (I) Scope Listing, identifying major research areas, application functions and sources of information that define the scope of the information access problem; (II) Catalog of Existing Systems, that identifies and briefly describes the major systems that currently exist to provide access to human-environment information; (III) A listing of Reference Bibliographies, that indicates the range of previously published materials dealing with human-environment relationships; (IV) A list of Key Reference Sources; (V) On-line Source Reviews, two analyses of the sources of information used in major on-line information retrieval systems.

PB80-103070 PC **A15**/MF **A01**
Association for the Study of Man-Environment Relations, Inc., Orangeburg, NY.
Feasibility Study on Improving Access to Information about the Impact of the Built Environment on the Health and Lives of People; Project Consultants, Appendix VI-IX,
D. Michael Murtha. 25 May 79, 326p
Contract DHEW-278-77-0055
See also Appendix I-V, PB80-103062.
Also available in set of 3 reports PC E12, PB80-103047.

The appendices provide back-up reference material for the Final Report Appendices included in this volume which are: (VI) The Directory of Project Participants; (VII) Written Responses, samples of consultant inputs at various stages on the project; (VIII) Meetings with staff, summary descriptions and sample inputs from three expert consultant meetings; (IX) Project Mailings, copies of the materials were sent to the consultants for their comments during the study.

PB80-104706 PC **A07**/MF **A01**
National Library of Medicine, Bethesda, MD.
Medical Subject Headings, Tree Annotations, 1980,
Thelma Charen. Sep 79, 126p NLM/MED-79/05
Supersedes PB-288 181. See also report dated Jul 79, PB-300 500.

Designed for medical indexers and searchers, MeSH Tree Annotations has a two-fold purpose: first, to give a general statement on the approach an indexer or searcher should pursue to a given tree, and second, to advise him of special features within that tree that he should be aware of before indexing or searching.

PB80-106420 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC.
NBS Library Handbook for NBS Staff,
Nancy H. Knight. 1978, 75p NBSIR-79-1928

This publication describes NBS Library services, policies, resources, and lists personnel.

5C. Economics

BTHE-030912 PC**$30.00**
Norges Vassdrags- og Elektrisitetsvesen, Oslo.
Norwegian Wiring Regulations - Regulations for Electrical Installations.
1978, 502p

Sponsored in part by British Standards Institution, Hemel Hempstead (England). Technical Help to Exporters.
Price to members $30.00.

The construction, maintenance and operation of electrical installations are subject to official supervision and inspection. Official inspection is undertaken by the Norwegian Water Resources and Electricity Board (Norwegian abbreviation: NVE) with the Electricity Inspectorate as the executive body. This supervision does not cover light-current installations, apart from those parts which cross or come into dangerous proximity to heavy-current installations or parts located in hazardous areas. The Electricity Inspectorate is required to ensure that the Regulations laid down for electrical installations are observed and to inspect all installations which are subject to notification in order to be satisfied that all requirements are met. This document covers the regulations for low, medium and high voltage installations. Regulations for electrical tramway and railroad installations are omitted from this translation.

HRP-0027855/6 Not Available NTIS
Stanford Univ., CA. Graduate School of Business.
Rx for Health Care Economics -- Competition, Not Rigid NHI.
Alain C. Enthoven. 1978, 8p
Pub. in Hospital Progress v59 n10 p44-51 Oct 78.

This article contends that the market for medical services could be restructured so that competition would yield significant benefits. Several competing organized systems, each emphasizing a different mix of characteristics and each designing its program for a different market segment, could increase consumer satisfaction more effectively than a single uniform plan approach. Moreover, given such competing systems, the public could make more informed and intelligent health care choices than they do under the existing fragmented fee-for-service, third-party financed system. At present, neither physicians, hospitals, nor third-party payers possess leverage to control costs while guaranteeing quality service. It is argued that a national health insurance scheme or a regulatory scheme that would freeze the health delivery system in its present costly and noncompetitive state should be avoided; that establishing organized systems that can compete effectively requires aggregating a certain amount of consumer buying power in a market area so that someone can negotiate for economies in the hospitals and for fees and utilization controls with the physicians; and that the Federal Government should find ways to put health maintenance organizations and other competing systems on an equal footing with respect to per capita cost supported by tax dollars.

PB80-100159 PC **A05**/MF **A01**
National Planning Association, Washington, DC.
Developpement Economique (Selection I) (Economic Development, Section IV),
Frances M. Geiger. Jul 61, 94p
Text in French. Sponsored in part by Agency for International Development, Washington, DC.

This translation of an English publication titled (Economic Development, Section IV) covers the following: A new concept of American assistance to foreign countries during the years 1960 to 1970 with excerpts from speeches made by the President of the United States; Science and technology, and how they can benefit developing countries with studies of some recent realizations; Human investments; Utilization of used machinery in the developing countries; Some examples of the choice of technology in manpower programs; Relative advantage and policies of expansion; Small industry in the economic development; Banks of industrial development in tropical Africa; International partnerships; Proposed reforms for the world monetary system; Two meetings on the economic development in Latin America 1960 and Asia and the Far East 1960.

PB80-100290 PC **A05**/MF **A01**
Small Business Administration, Washington, DC.
Petite Entreprise - Le Lancement des Produits (New Product Inroduction for Small Business Owners),
Peter Hilton. 1961, 99p
Text in French. Sponsored in part by Agency for International Development, Washington, DC.

Why and how to introduce a new product, and what product to consider, is outlined in this translation of an English publication titled 'New Product Introduction for Small Business Owners'. Competition with large institutions through regional sales, price cutting, imaginative presentation, and obtaining the goodwill of customers, are discussed. Market research, market share, pricing policy, export possibilities, legal restrictions, the use of specialists such as engineering consultants, advertising agencies, and industrial research bureaus are examined. Other factors discussed include warranty, maintenance, saturation point, and ways of measuring success over a period of time. Necessary requirements for a new product launch such as demand, distribution, effect on competition, and timing are also discussed. Some failures of new product launching are analyzed and a table listing results from 200 major firms is included. References to government and private publications are given.

PB80-100340 PC **A03**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Div. of International Affairs.
Comment Etablir une Association d'Epargne et de Credit (Establishing Savings and Loan Associations in Less Industrialized Countries),
Roy J. Burroughs. Mar 67, 35p
Text in French. See also English version, PB-294 312. Sponsored in part by Agency for International Development, Washington, DC.

Savings and Loan Associations as a source of money for financing home loans are considered. Questions relative to bankruptcy, interest, default, size of loan, and legal considerations are posed. Other factors to be considered before starting a successful Savings and Loan Association such as number of inhabitants, economic activity, the construction scene, fiscal considerations, public financing, average amount of savings are discussed. Interest margin, the importance of and the area of influence of a Savings and Loan Association, personnel, budget- and liquidity considerations, are also discussed. A bibliography and a sample calculation of revenue and expenses, including an explanation of terms, are given.

PB80-101090 MF **A01**
Department of Commerce, Washington, DC.
Business America - The Journal of Industry and Trade. Volume II, Number 23, November 5, 1979.
Bi-weekly pub.
5 Nov 79, 44p
See also Volume 2, Number 21, PB-300 675.
Paper copy available from Supt. of Docs.

Contents:
U.S. and China to exchange trade shows;
New law streamlines export control process;
Boatique America gets enthusiastic welcome;
NFTC delegates chart new trade policy;
Washington trade briefs;
Foreign industrial production declines in August;
Domestic business report;
Economic highlights;
Business outlook abroad;
Worldwide business opportunities.

PB80-101579 PC **A07**/MF **A01**
Anderson, Perry and Associates, Inc., La Grande, OR.
Water System Feasibility Study, Confederated Tribes of the Umatilla Indian Reservation.
Oct 79, 126p EDA-79-0158
Grant EDA-07-06-01898

The overall objective of this report is to evaluate the requirements for and the feasibility of constructing and installing a public water system to serve the Mission Basin portion of the Umatilla Indian Reservation.

PB80-102544 PC **A14**/MF **A01**
Federal Trade Commission, Washington, DC. Bureau of Economics.
Grocery Retailing Concentration in Metropolitan Areas, Economic Census Years 1954-72,
Gerald E. Grinnell, Russell C. Parker, and Lawrence A. Rens. 1972, 312p FTC/BE-79/06
Sponsored in part by Economics, Statistics, and Cooperatives Service, Washington, DC.

The statistical report, the product of a joint effort by the United States Department of Agriculture and the Federal Trade Commission, presents a set of data relating to grocery retailing in the United States. It includes measures of concentration, employment, selling area, and other characteristics of grocery retailing in the Nation's Metropolitan Statistical Areas (SMSA's), obtained from special tabulations prepared by the Bureau of the Census from its 1972 census of business. The data presented are the latest available. The 1972 data provides a reasonably accurate picture of the industry today, since market structures do not generally change rapidly. Historical data included in the report, dating back to the 1954 census, give a picture of the process of change. The data in the report are potentially useful in research, business decision-making, antitrust, and other areas of public policy determination.

PB80-106123 PC **A04**/MF **A01**
Futures Group, Inc., Glastonbury, CT.
Corporate Strategies of Automotive Manufacturers. Volume I: An Executive Summary.
Final rept. Oct 77-Nov 78,
Harold S. Becker. Nov 78, 55p DOT-HS-804 914
Contract DOT-HS-7-01784
See also Volume 3, PB80-106131.

The study was sponsored to garner an understanding of the likely strategic actions of automotive manufacturers in light of government regulations on passenger automobile fuel economy. Ussing a series of quantitative and judgmental models, the study team estimated the attractiveness of a number of alternative strategies for each manufacturer and assessed the long-term impact upon financial and other characteristics of each firm as a result of their pursuing those strategies deemed most suitable. Results indicate that technological strategies appear to be more attractive responses for the financially stronger firms. Lobbying strategies are important to all, but most important to weaker firms, which is also true of organizational strategies. Potential marketing strategies to deal with fuel-economy standards appear to be unattractive to all firms. The current objective of the auto companies seems to be to provide the same interior space (both passenger and luggage) and the same acceleratio performance (power-to-weight ratio) as has been known in the past. This constraint is being imposed by the consumer in the form of some resistance to lower performance, less commodious vehicles. The 'secret weapon' the auto companies have not yet fully publicized is a plan to market two-passenger specialty vehicles. These can have excellent performance while still improving the fleet-average fuel economy. Technologically, the fuel-economy regulations will be met by repackaging the cars using front-wheel-drive configurations, lighter weight materials, and monocoque construction techniques for bumpers, hoods, doors, and trunks. Higher efficiency four- and five-speed automatic and manual transmissions will be used in conjunction with electronically managed, four- and six-cylinder, turbocharged diesel, stratified-charged, and Otto-cycle engines. The most important conclusion from this study is that all of the domestic manufacturers will survive and will meet the 1985 fuel-economy standards. However, American Motors Corporation will be in the process of phasing itself out of passenger automobiles in order to emphasize its light-truck and bus business. Furthermore, Chrysler's market share will have decreased in the face of increased competition from General Motors, Ford, and foreign nameplate manufacturers.

PB80-106131 PC **A09**/MF **A01**
Futures Group, Inc., Glastonbury, CT.
Corporate Strategies of Automotive Manufacturers. Volume III: An Historical Perspective on the Automotive Industry.
Final rept. Oct 77-Nov 78,
Harold S. Becker. Nov 78, 194p DOT-HS-804 916
Contract DOT-HS-7-01784
See also Volume 1, PB80-106123, and Volume 4, PB80-106149.

The material included in this volume presents an historic overview of the corporate strategies of the four major automotive manufacturers. This report describes the socioeconomic environment over the past 20 years and how each automotive manufacturer has historically responded to external influences and what its resulting financial and other characteristics have been. The first chapter deals with conditions in the United States that importantly influenced the automotive industry. A combination of changes in economic conditions, the labor force, international trade, government regulations, and consumer lifestyles caused the manufacturers to change business strategies and product lines. The following chapters deal specifically with each automotive manufacturer and how it responded to the pressures exerted upon it. The four manufacturers are highly competitive with one another. Each must operate under the same set of pressures: government regulations, labor relations, foreign competitors, availability of materials, and fluctuations in the economy. However, each company is markedly different in relation to its strength in the marketplace. General Motors has the ability to draw upon vast resources and has an efficient management structure that makes it the strongest company. It is in direct contrast to American Motors Corporation, whose prime concern has been to attain a break-even volume and maintain an adequate share of the passenger-car market. Ford is in direct competition with General Motors and the imports for market share. Because of its financial condition, Ford cuts costs in years of decreased profits since it typically has not had the financial reserves to continue expending in lean years. Chrysler, the borderline company of the Big Three, increasingly has become financially troubled. The company has experienced a decreasing market share and increasing debt-equity ratio in recent years.

PB80-106149 PC **A03**/MF **A01**
Futures Group, Inc., Glastonbury, CT.
Corporate Strategies of Automotive Manufacturers. Volume IV: Adaptation of a Computer Simulation Model of the Industry.
Final rept. Oct 77-Nov 78,
Harold S. Becker. Nov 78, 36p DOT-HS-804 917
Contract DOT-HS-7-01784
See also Volume 3, PB80-106131.

The report summarizes the work performed to date in adapting a computer simulation model for use in studying the corporate strategies of automotive manufacturers. This study is sponsored by the National Highway Traffic Safety Administration to help it understand the likely strategic actions of automotive manufacturers in light of government regulations on passenger automobile fuel economy. The original model was developed by Pugh-Roberts Association to aid in assessing the corporate strategies of automotive manufacturers as they respond to changing economic, regulation, and consumer buying patterns. The original model was found to be using incorrect historical data as well as having several structural deficiencies in need of correction. Several of the recommended changes already have been incorporated in The Futures Group version of the model, resulting in a reasonable fit between historical auto sales and the model's simulation of auto sales. Until the balance of the recommended changes are made, the remaining outputs from the model are not usable. A cost estimate to complete the recommended changes is given at the end of the report.

5D. History, Law, and Political Science

AD-A073 921/9 PC **A09**/MF **A01**
Naval Postgraduate School Monterey CA
The Ascendance of Iran: A Study of the Emergence of an Assertive Iranian Foreign Policy and Its Impact on Iranian-Soviet Relations.
Master's thesis,
James Harlon Williams. Jun 79, 193p

In the wake of the British withdrawal from the Persian Gulf and the third Indo-Pakistani war, Iran's leadership revised its foreign policy with the intent both of succeeding Britain as the policeman of the Persian Gulf as well as committing the country to a more active role in regional affairs. Iran's Dhofar expedition in 1973 and support for the Kurdish rebellion in Iraq in 1974 posed a challenge to Soviet interests in the region. Soviet concern was exacerbated further by the scope of Iran's post-74 arms purchases, by the success of its petro-dollar campaign to reduce Soviet influence on the subconti-

nent and in the Horn of Africa, and by Sino-Persian support for Muslim Insurgents in Afghanistan. When the Iranian revolution erupted in 1978, Moscow was initially content to remain on the sidelines. The Kremlin is now actively attempting to improve its ties with the Iranian left, however, in the hope of influencing the policies of a post-Khomeni government. (Author)

AD-A073 950/8 PC **A99**/MF **A01**
Brookings Institution Washington DC
Mailed Fist, Velvet Glove: Soviet Armed Forces as a Political Instrument.
Technical rept. 1 Jul 77-30 Sep 79,
Stephen S. Kaplan, David K. Hall, Paul Jobber, Roman Kolkowicz, and Thomas W. Robinson .
30 Sep 79, 1215p
Contracts N00014-77-C-0479, ARPA Order-2820
See also AD-A073 951.

This study was conducted in order to determine the historical record of the use of Soviet armed forces as a political instrument since the Second World War; to gain an understanding of the USSR's readiness to use military power in the pursuit of foreign policy objectives and the willingness of Soviet leaders to accept risks in doing so; to evaluate the utility of political-military operations to Soviet interests and foreign policy goals; and to realize the implications of this Soviet behavior for U.S. interests and American foreign and defense policies.

AD-A073 951/6 PC **A02**/MF **A01**
Brookings Institution Washington DC
Mailed Fist, Velvet Glove: Soviet Armed Forces as a Political Instrument. Executive Summary.
Technical rept. 1 Jul 77-30 Sep 79,
Stephen S. Kaplan, David K. Hall, Paul Jabber, Roman Kolkowicz, and Colin Legum. 30 Sep 79, 25p
Contract N00014-77-C-0479, ARPA Order-2820
See also AD-A073 950.

This study was conducted in order to determine the historical record of the use of Soviet armed forces as a political instrument since the Second World War; to gain an understanding of the USSR's readiness to use military power in the pursuit of foreign policy objectives and the willingness of the Soviet leaders to accept risks in doing so; to evaluate the utility of political-military operations to Soviet interests and foreign policy goals; and to realize the implications of this Soviet behavior for U.S. interests and American foreign and defense policies.

AD-A074 291/6 PC **A03**/MF **A01**
Army Infantry Center and Fort Benning GA
History. Annual Supplement, 1964.
2 Aug 65, 50p

This annual supplement is a resume of significant events which occurred during calendar year 1964 and is considered to be of value for headquarters staff members in formulation of plans and policies. Problems encountered, their solutions and the results obtained are outlined. Information contained in this report is based on reports submitted by section historical officers. Supporting documents are on file in the Office of the Chief of Military History and in this headquarters. Of necessity, the historical report is presented objectively and in brief summary. Tedious, detailed discussion of problems have been avoided.

HRP-0029185/6 Not Available NTIS
Political, Social, and Educational Forces on Nursing -- Impact of Political Forces.
1978, 28p
Available from National League for Nursing, 10 Columbus Circle, New York, NY 10019.

The three papers in this publication are concerned with the impact of political forces at various levels of nursing. The purposes of the opening paper are to review the evidence concerning the existence or absence of a registered nurse shortage, to consider the current state of supply of these nurses, to explore some efforts aimed at projecting the supply and requirements for nurses, and to consider future shortages or surpluses. Subsequent discussions consider issues likely to affect the future of nursing education. Several political forces which have major implications for the continuing professionalization of nursing -- e.g., identifying broader career opportunities for females -- are outlined. Finally, actions which can exert a political force, such as running for office, writing a letter about an issue of concern, and supporting organizations capable of influencing policy, are identified. The point is made that nurses must become more sensitive and knowledgeable about the political process if nursing is to continue to make its own decisions about education and practice.

PB80-101264 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. International Div.
Changes Needed in the Administration of the Overseas Food Donation Program.
Report to the Congress.
15 Oct 79, 99p ID-79-25

This report assesses how well the U.S. food donation program abroad is achieving congressional objectives of assisting needier countries and people and contributing to the development process. It addresses specific recommendations to the Administrator of the Agency for International Development. More fundamentally, however, the report recommends that the Congress centralize full authority and responsibility for the program in the Agency and its new umbrella organization, the International Development Cooperation Agency. GAO believes this would strengthen the Agencies' ability to administer the program and would improve accountability to the Congress. The report further suggests that the new title III food-for-development program also be considered for similar transfer to the Agencies.

PB80-105943 PC **A02**/MF **A01**
New York Sea Grant Inst., Albany.
Current Use of Water Surface Zoning for Recreation.
Tommy L. Brown, Edward J. Finegan, and Michael P. Voiland. Apr 79, 12p NYSG/RR-79/27, NOAA-79091406
Pub. in Water Resources Bulletin, v15 n2 p337-344 Apr 79. Prepared in cooperation with Cornell Univ., Ithaca, NY. Dept. of Natural Resources.

As the many recreational uses of waterways have intensified, management agencies have increasingly turned to water surface zoning techniques to provide safe, equitable opportunities while also protecting aquatic habitats. Other publications have described the concept of water surface zoning; the study reported on was conducted to determine its current use nationwide. Depending on jurisdiction of the water surface in question and state legilation to zone water surfaces, nonfederal zoning regulations sometimes emanate directly from state government, and sometimes involve direct state and local government cooperation. Results of a national survey show that water surface zoning techniques employed by state and local governments in 1976-77 fall into five broad categories: restrictions on boat speed and horsepower, special use zoning, time zoning, protective space zoning, and limited density zoning. Examples of each are reported on in this paper.

5E. Human Factors Engineering

AD-A074 103/3 PC **A11**/MF **A01**
Office Chief of Research and Development (Army) Washington DC
Annual Army Human Factors Research and Development Conferences (9th), 14 - 17 October 63.
31 Oct 63, 248p

No abstract available.

AD-A074 218/9 PC **A02**/MF **A01**
Picatinny Arsenal Dover NJ Samuel Feltman Ammunition Labs
Methodological Applications of Human Factors in Operations Research.
Human engineering technical memo. no. 16,
George A. Peters, Jr., and C. Thomas Goldsmith.
May 57, 21p

This case study report includes (1) a description of some of the human factors involved in a weapons systems analysis of the effectiveness of anti-personnel mines, (2) an a priori (theoretical) solution for a component of the system, (3) the actual empirical results obtained from field test of the component, and (4) how this relates to the methodological applications of human factors in operations research. The following points are emphasized: (a) Adequate attention should be given to the human components of man-machine systems in operational analyses. (b) The nature of the decisions resulting from OR evaluations demand acceptable levels of component validity. (c) Common sense and logic when applied to the human variable is quite apt to be erroneous. (Author)

5F. Humanities

DOE/SR/01072-3 PC **A03**/MF **A01**
South Carolina Univ., Columbia. Inst. of Archeology and Anthropology.
Intensive Archeological Survey of a Potential Defense Waste Processing Facility Site, Savannah River Plant, Aiken and Barnwell Counties, South Carolina. Research Manuscript Series 149.
R. D. Brooks, and G. T. Hanson. 1979, 35p
Contract EW-78-S-09-1072

Since no archeological remains were uncovered in the proposed DWPF construction area, it is recommended that the area be cleared for archeological purposes. To assure preservation of any buried sites well beneath the present ground surface in the construction area, it is suggested that the Department of Energy arrange to have an archeologist monitor the excavation of the building sites for the DWPF. By monitoring we feel that to keep the construction progress unencumbered a process be devised by which an archeologist makes daily checks of the spoil piles for archeological material. Regarding related construction on the periphery of the main construction area (e.g. roads, powerlines, waterlines), it is recommended that the triangle formed by the roads F, 4 and E be cleared for construction of any type for archeological purposes. However, it is recommended that the Department of Energy notify the archeologists to monitor the construction for possible buried sites. Although the site 38AK261 is not considered to be significant to present or future research, it is recommended that an archeologist be notified when construction in that area is to take place in order to monitor any archeological materials uncovered. (ERA citation 04:048197)

PB80-101173 PC **A08**/MF **A01**
New World Research, Inc., New Orleans, LA.
Cultural Resources Survey and Evaluation of the Cane Creek RC and D Measure, Lincoln County, Arkansas.
Rept. of investigations,
Marco J. Giardino. Mar 79, 159p RI-16
Contract HCRS-C5865(79)

During December, 1978 and January, 1979, a survey of the Cane Creek RC & D Measure in Lincoln County, Arkansas was conducted. A total of 1,087.74 acres was surveyed, and ten sites were evaluated by controlled surface collection and subsurface testing in the area of proposed construction and inundation. Sites in the project area represented occupations dating from late Archaic to the Mississippian periods. All sites have been largely destroyed by agricultural and timbering activities conducted in recent times. Surface collections resulted in the definition of site size; the isolation of intra-site localities through artifact density, and the establishment of a subsurface testing design. A total of 2,961 lithic pieces and 567 prehistoric sherds was recovered during the survey. Testing at most of the sites consisted of a combination of shovel/auger and I m x I m test pits. No subsurface prehistoric features were discovered at sites tested during this project.

PB80-102726 PC **A06**/MF **A01**
Arizona State Museum, Tucson. Cultural Resource Management Section.
An Archaeological Overview of the Middle and Lower Santa Cruz Basin.
Final rept.,
Deborah A. Westfall. Jun 79, 113p
ARCHAEOLOGICAL SER-134, DI/BR/APO/CCRS-79/2
Color illustrations reproduced in black and white.

The Arizona Projects Office, Bureau of Reclamation has begun planning for the Central Arizona Project (CAP), Tucson Division, which is designed to bring CAP water to Tucson. This report summarizes and evaluates previous archaeological research and the known cultural resource base within a 1550 square mile area in southeastern Pinal and northeastern Pima counties that might be affected by construction of proposed alternatives. A detailed consideration of the archaeological record shows that a wide variety of sites exists in the project area that vary considerably in composition and distribution. At this preliminary stage of study, specific site types are correlated with specific environmental zones to provide a predictive model of cultural resource sensitivity. This predictive model, while suitable for preliminary planning purposes, is in need of testing by archaeological survey to confirm predictions of site distribution.

PB80-104078 PC **A04**/MF **A01**
Archeological Services, Laramie, WY.
National Register Evaluation of Village Site 39BK7, Oakwood Lakes State Park, Brookings County, Eastern South Dakota.
Final rept.,
John W. Greer. May 79, 59p EPA/908/3-79/003

In October 1978 Archeological Services performed a National Register evaluation of site 39BK7 in Brookings County, South Dakota. This was done for the Environmental Protection Agency in their Oakwood Lakes Bank Stabilization Project, which will affect a small portion of the archeological village. The site is believed to be significant and eligible for the National Register. Minimal exploratory archeological work is recommended in the direct impact zone before construction begins; other areas of the site should be avoided.

5H. Man-Machine Relations

AD-A074 111/6 PC **A02**/MF **A01**
Naval Air Development Center Warminster PA Anti-Submarine Warfare Lab
Status of Electroluminescent Picture Display Panels.
Phase rept.,
F. B. Uphoff. 17 Nov 61, 22p Rept no. NADC-AW-6108

The state-of-the-art of electroluminescent picture display panels was studied to determine the practicability of these panels for aircraft ASW displays now using cathode-ray tubes. Ferroelectric, photoconductive, piezoelectric, and transmission-line panels were investigated. None of these panels have been developed to the stage where they can be considered for use in ASW display devices. However, the rapid advances in the developmental work give good cause for optimism. (Author)

5I. Personnel Selection, Training, and Evaluation

AD-A073 834/4 PC **A09**/MF **A01**
George Washington Univ Washington DC Program in Logistics
An Exercise of the Dynamic Student Flow Model,
William E. Caves, Dicky Wieland, and W. L. Wilkinson. 21 May 79, 176p Rept no. SERIAL-T-398
Contract N00014-75-C-0729

The Dynamic Student Flow Model is a computer-based system using network flow theory for producing solutions with the maximum throughput of flight students with the minimum time to train. A principal result is the input and output schedule plus a variety of data for analyses of the jet, prop, and helo pipeline flows. This paper documents the results of exercising the model on six distinctly different scenarios. Each scenario emphasizes some particular capability of the model, illustrating its flexibility at the executive, staff, and managerial levels of applications. Certain strengths and weaknesses of the current version of the model also become readily apparent. (Author)

AD-A073 838/5 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
A Cradle for Aviation Talents. Nanking Aviation College.
7 Dec 78, 10p Rept no. FTD-ID(RS)T-1654-78
Edited trans. of Hang K'ung Chih Shih (China) n5 p6-7 1978, by Jerry K. Chung.

No abstract available.

AD-A073 860/9 PC **A07**/MF **A01**
Human Resources Research Organization Alexandria VA
Studies in Long Range Target Identification.
Research rept. 13 May-29 Dec 78,
William L. Warnick, and Albert L. Kubala. Jul 79, 148p HUMRRO-FR-WD-TX-78-16, ARI-RR-1216
Contract MDA907-78-C-2017

This report describes the development of two training programs in long range target recognition/identification. One program is a self-administered program in a slide/tape format. The other is designed for use in a classroom and employs 35mm slides. A complete intructor's guide is provided for the classroom program. A pilot study in nighttime target identification is also described. (Author)

AD-A073 886/4 PC **A05**/MF **A01**
Army War Coll Carlisle Barracks PA
Manpower Management at CONUS Installations: Who Should Manage and Why.
Group study project,
David L. Pemberton, John H. Kraus, Ted V. Cooper, and James T. George. 11 May 79, 81p

The basic objective of the study was to determine if the Army should have a uniform policy for the management of manpower and other force development functions at CONUS installations; and if so, how should the functions be managed and who should do it. Data were gathered by a study of Army documents, interviews with general officers on the DA staff, selected general officers and their staffs assigned to MACOMs, and other interviews with personnel assigned to selected CONUS installations. A DA approved questionnaire was used to survey 105 CONUS installations. Major conclusions were that the Army needs to improve its manpower management and improve the career programs of those personnel employed in this function. These improvements can be best made in the Comptroller organizations at HQDA, MACOMs and installations. (Author)

AD-A073 887/2 PC **A08**/MF **A01**
Army War Coll Carlisle Barracks PA
The Role of the Foreign Area Officer in National Security Policymaking in the 1980's.
Individual study project,
Verner N. Pike. 18 May 79, 159p

The Foreign Area Officer specialty is, today, a multi-faceted advanced entry OPMS career track, requiring complex and diverse training for full qualification as a regional specialist. Are both functional and regional skills compatible and supportive of OPMS professional development objectives. The primary emphasis of the FAO specialty is regionally oriented with the objective of producing senior officers highly skilled and experienced in politico-military affairs. Increasing requirements for General Officers possessing these acquired skills provides a unique career opportunity for regional FAO specialists. The study concludes that several functional skills be deleted from identification with the FAO specialty; overseas training and language preparation be modified; graduate schooling continue to be emphasized and related directly to regional specialization; the FAO Course be terminated; and that selected General Officer positions be identified with the FAO regional specialty. (Author)

AD-A073 922/7 PC **A11**/MF **A01**
Naval Postgraduate School Monterey CA
An Examination of Unrestricted Line Women Officers' Career Patterns and Related Issues.
Master's thesis,
Victoria S. Matthews, and Sylvia S. Almendinger. Jun 79, 230p

With the increasing participation of women in the Naval Service, it is incumbent upon the Navy to provide meaningful utilization of these women. Women officer career development/career patterns are of significant influence in attracting and retaining high caliber young women in the Naval Service. Of particular interest is the status of women unrestricted line officers (110x), who do not have the opportunity to attain warfare qualifications. This thesis researches the current situation regarding women URL (110X) career development/patterns, with emphasis on such areas as leadership development, functional areas, Navy requirements and their structure, along with the interaction of these factors. Some predictions concerning career patterns flows, career development viability, and policy implications are also addressed. (Author)

AD-A073 961/5 PC **A10**/MF **A01**
Naval Postgraduate School Monterey CA
The Process of Determining Manpower Requirements and its Relationship to PPBS.
Master's thesis,
Reginald Timothy Martel. Jun 79, 219p

The purpose of this thesis is to describe the Navy's manpower requirements determination process and to demonstrate how these requirements are used by the Department of Defense Planning, Programming and Budgeting System (PPBS), the Navy's Program Objective Memoranda (POM) development, the Navy's three manpower requirements determination programs (ships, aircraft squadrons and shore establishments), and a classroom simulation of the Navy's POM development process. The existing system key players, major roles, chronology of events and organizational inter-relationships are described as they currently function. (Author).

AD-A073 965/6 PC **A05**/MF **A01**
Naval Postgraduate School Monterey CA
Naval Aviator Retention: Predicting Retention and Identifying Related Variables.
Master's thesis,
Virgil Griffith Cook, Jr. Jun 79, 95p

The research described in this thesis was directed toward determining the feasibility of using the Navy's HRM Survey to accurately predict aviator retention six to eighteen months in the future. Another objective was to determine if variables which discriminated Careerists from Resignees would provide sufficient understanding of retention behavior to enable Navy management to develop effective action plans aimed at solving aviator retention problems. Discriminant-function equations, in cross-validation, correctly classified 90% of the naval aviator sample into groups -- Careerists and Resignees. Additionally, discriminant-function analysis generated discriminating variables which provided insight into career retention behavior. Attitude measures, command climate and general satisfaction, were found to be highly correlated with personnel retention. (Author)

AD-A073 980/5 PC **A04**/MF **A01**
Center for Naval Analyses Alexandria VA
An Analysis of Delayed Entry into Class A Schools,
William M. Evanco. May 79, 52p Rept no. CRC-390
Contract N00014-76-C-0001

This report evaluates delayed Class A technical school entry versus immediate entry after recruit training. The effects of recruit background and service characteristics on first-term loss and reenlistment probabilities are measures. Conclusions are drawn about the selection of enlistees for A school attendance either immediately after recruit training or after general duty in the fleet on the basis of their characteristics. (Author)

AD-A073 994/6 PC **A12**/MF **A01**
Department of the Army Washington DC
Management and the Executive: Philosophy, Problems and Practices.
Rept. bibliography 1975-1979.
1979, 261p Rept no. DA-PAM-600-10-1-SUPPT
Updates rept. no DA-PAM-600-10-1, dated 15 Sep 75, AD-A017 233.

Annotated bibliography of recent writings on management and management personnel. Includes over 800 book and periodical articles written between 1975 and March 1979. Entries are arranged by subject and accessed by an analytical table of contents. This bibliography was compiled by the

staff of the Army Library at the request of Deputy Chief of Staff for Personnel, Training and Career Management Division, United States Army.

AD-A074 020/9 PC **A06**/MF **A01**
McDonnell Douglas Astronautics Co St Louis MO
Orientation/Time Management Skill Training Lesson: Development and Evaluation.
Final rept.,
Jacqueline L. Dobrovolny, Barbara L. McCombs, and Wilson A. Judd. Jul 79, 117p AFHRL-TR-79-14
Contract MDA903-77-C-0144, ARPA Order-3329

Materials contained within this report are designed to assist students in their adaptation to the novelties of a computer-assisted or managed instructional environment. This Orientation/Time Management lesson provides students with appropriate role models for increasing acceptance of their increased responsibility for learning and, it introduces a progress tracking approach to assist students in achieving completion goals in a self-paced training environment. Evaluation data from an implementation of these materials in the Air Force Advanced Instructional System (AIS) suggest that substantial time savings can be obtained by a combination of this type of orientation and time management skill training with a computer-based progress targeting and feedback system (on the order of 9 to 18 percent reduction in course completion times). (Author)

AD-A074 021/7 PC **A07**/MF **A01**
McDonnell Douglas Astronautics Co St Louis MO
Computer-Managed Instruction: Development and Evaluation of Student Skill Modules to Reduce Training Time.
Final rept.,
Barbara L. McCombs, Jacqueline L. Dobrovolny, and Wilson A. Judd. Aug 79, 134p AFHRL-TR-79-20
Contract MDA903-77-C-0144, ARPA Order-3329

The development and evaluation of the CMI Student Skills Project are described within the context of the Air Force Advanced Instructional System (AIS). The student skill modules developed were designed as short packages to be assigned near the beginning of any military technical training course, but which included strategies or procedures that would continue to affect student behavior throughout the course (e.g., behavioral self control techniques). Following a series of student interviews to determine the characteristic problems students encounter in a CMI system, an Orientation to CMI/Time Management Lesson and Study Skills Package were developed and implemented. The Study Skills Package included a self-rating Student Study Skills Questionnaire and four study skills training modules in the areas of reading comprehension, memorization, test taking, and concentration management skills.

AD-A074 087/8 PC **A02**/MF **A01**
Linton and Co Inc Washington DC
Air Force Enlisted Mobilization Training,
Harris Y. Lauterbach. 18 Jul 79, 11p
Contract MDA903-77-C-0151

The study examines the adequacy of the Air Force training base capacity to accommodate recruit and specialized skill training under mobilization. The study concludes that the total training base structure is adequate, but recommends further detailed actions to balance capacities and training loads for individual skill courses at each training location. (Author)

AD-A074 094/4 PC **A05**/MF **A01**
Georgia Inst of Tech Atlanta School of Industrial and Systems Engineering
Studies: Investigate Slope of the Learning Curve; Explore Tracking Around Target Edges.
Final summary rept.,
Leslie G. Callahan, Jr., Russell G. Heikes, Thomas L. Sadosky, and Harrison M. Wadsworth. Jul 79, 98p
Contract DAAG39-78-C-0047

The first task was directed at developing a methodology for using a thinly-based learning curve slope to assess status of unit training in operational test and evaluation. The contractual objective of this effort was to develop a simple, straightforward methodology for calculating the significance of the difference between two slopes, one representing the experimental case and one the control case, when one or both curves are based on relatively few points and there is variance in the point estimates for both curves. The second task was primarily directed at developing a hitting performance model for manual line-of-sight optical tracking in the range 500 to 3000 meters with a large size target approximately 4 feet in radius. Under terms of the contract, major attention would be directed at testing the hypothesis used in most guide-to-line-of-sight missile system simulations that the tracking error is normally distributed. In addition a number of collateral research studies are reported which were not part of the contract specifications, but are important in attempting to model and understand the performance of a gunner in the line-of-sight tracking situation.

AD-A074 148/8 PC **A02**/MF **A01**
Army Infantry School Fort Benning GA
Ranger.
1959, 24p

This pamphlet has been designed to provide you with a history of the Ranger and to orient you on the Ranger course. For the prospective student, it answers many questions that will assist in preparation for Ranger training. The Ranger course has the capability of developing the overall combat potential of junior leaders to a higher degree than any other course in the Army. Men who make excellent tactical decisions in the classroom or in normal training programs, sometimes fail miserably under the stress of combat. Hunger, fatigue, and the press of a tactical situation uncovers weaknesses which an individual never knew he had. An individual in Ranger training gains an insight into himself and his fellow man. Not every man can qualify as a Ranger. It is a challenge for the professional officer or hard core noncommissioned officer--a challenge to prove oneself under conditions of weather and terrain which equal and often exceed those encountered in combat. The Ranger course affords the junior leader the opportunity, by practical application, to develop and to prove himself in a rugged course of instruction.

AD-A074 159/5 PC **A04**/MF **A01**
Applied Psychological Services Inc Wayne PA Science Center
Personnel Psychophysics: Quantification of Malfunction Detection Probability.
Technical rept.,
William Miehle, and Arthur I. Siegel. Dec 67, 65p
Contract N00014-67-C-0107

The logic of a technique for employing technician confidence that a defect exists for maximizing the probability of malfunction recognition is described. The technique is based on and drawn from parallel thinking in signal detection theory. Operator characteristic curves are derived for a variety of distributions of confidence. Continuous and discrete distributions of confidence are considered as well as single and double criterion levels. The implications of the work for training and posttraining performance evaluation are pointed out. (Author)

AD-A074 175/1 PC **A03**/MF **A01**
Construction Engineering Research Lab (Army) Champaign IL
The Job Activities Description (JAD) Questionnaire: An Analysis of Time Spent on and Importance of Managerial Duties.
Interim rept.,
Robert L. Ellison, Clifford Abe, David G. Fox, and Wayne D. Veneklasen. Sep 79, 47p Rept no. CERL-IR-E-157

The Job Activities Description (JAD) was administered to 394 U.S. Army Corps of Engineers employees at GS levels 11 through 16 to examine the nature of job activities for these personnel. The JAD focused on management practices that were generally characteristic of key position within the Corps. Personnel at the lower levels (GS 11 and 12) spend much more time in Use Knowledge and Skills in a Technical Capacity--those activities for which an engineer is trained. Personnel at these levels can remain specialists. Personnel at higher levels (GS 15 and 16) spread their time over all nine of the categories studied, thus assuming the role of a manager and generalist, so that engineering duties become less important. This study resulted in a better understanding of the job activities rated as being of greater importance at the managerial levels of the Corps. The analyses indicated that the selection process should concentrate on an applicant's ability to perform those duties required at the higher level--not on past demonstrated ability in activities that may not be relevant at the higher level.

AD-A074 188/4 PC **A08**/MF **A01**
Naval Postgraduate School Monterey CA
The Two-Career Family in the Navy.
Master's thesis,
Della J. Suter. Jun 79, 169p

Two-career couples are studied and compared with military families having either a one-career/one-job lifestyle or a single-income lifestyle. The purpose of the study is to determine differences in attitudes and behavior of familes with the two-career lifestyle concerning their career intentions, career satisfaction and family services needs. A random sample of 459 married Naval officers was studied in the initial survey. The follow-up study involved 55 military members and 47 civilian spouses. It is found that two-career families were significantly different from one-career/one-job or single-income families in age, rank, designator, career intentions and family service needs. Transfers are the number one problem for two-career families. It is concluded that both the Navy and these families would benefit from adaptation of current transfer policies to the needs and desires of the more non-traditional career/family lifestyles. (Author)

AD-A074 189/2 PC **A07**/MF **A01**
Naval Postgraduate School Monterey CA
An Analysis of the Cost Implications of Employing Success Predictive Criteria in the Process of Selecting Navy Recruiters.
Master's thesis,
Mary Anderson Shupack. Jun 79, 142p

This study analyzed the performance of enlisted Navy recruiters from recruiting stations throughout the United States against a measure of effectiveness defined in terms of the NAVCRUITCOM Honor Roll. Six variables describing personal characteristics were analyzed in an attempt to explain recruiter success. The study showed that the best predictor of recruiter success was the level of formal education attained while the best explanation for recruiter failure was the individual's rate. Cost implications of high turnover and low productivity within the Navy recruiting force were then outlined and the role improved recruiter selection techniques could play in reducing these costs discussed. (Author)

AD-A074 190/0 PC **A05**/MF **A01**
Army Air Defense School Fort Bliss TX
Review of U. S. Army Air Defense Training Films.
1961, 76p

A review of existing training films and filmstrips pertaining to air defense is made each year in order to assist in the formulation of a production program for new and revised films. This annual review also provides a valuable aid to instructors who use these films. Discrepancies in existing films are indicated, and a current rating is shown for each film. This review supersedes the booklet, 1960, Review of U.S. Army Air Defense Training Films, published by this School. (Author)

AD-A074 191/8 PC **A09**/MF **A01**
Army Aviation School Fort Rucker AL
Proceedings of the Army Aviation Instructors' Conference.
1968, 186p

This is a short briefing which is designed to familiarize you with Fort Rucker and to give you a general knowledge of the activities which are conducted there. The Aviation Center and Aviation School are concerned primarily with teaching and training in Army aviation while these other five organizations at Fort Rucker are all study, research, or testing activities.

AD-A074 192/6 PC **A03**/MF **A01**
Continental Army Command Fort Monroe VA

Individual Training in Collecting and Reporting Military Information. Volume I.
1 Oct 51, 30p
See also Volume 2, AD-A074 193.

This brief is a practical guide which will assist the small unit commander in realistic intelligence training, integrated with the training program. Further expansion of the thought promulgated here is left to the ingenuity of the unit commander. A complete coverage of all possible situations is not attempted in the following pages; exploration and elaboration of the basic idea urged on all ranks grades.

AD-A074 193/4 PC **A04**/MF **A01**
Continental Army Command Fort Monroe Va
Individual Training in Collecting and Reporting Military Information. Volume II.
1 Sep 52, 60p
See also Volume 1, AD-A074 192.

This guide has been prepared with a view to effecting a maximum of economy in man-hours, training aids and facilities, yet insuring realistic intelligence training. The intelligence problems and training situations outlined herein can be applied at regimental, battalion, and company levels. Situations are based on the EEI (essential elements of information), the Collection Plan, and the S2's briefing of the patrol. Certain aspects of observation are developed, and the problems of patrolling are given extensive treatment. Implementation should not be limited only to the situations presented since complete coverage in this pamphlet of all the possible aspects of intelligence training is impractical. Rather, it is left to the ingenuity of the unit commander to fit these ideas to his own time, unit, and circumstances.

AD-A074 207/2 PC **A03**/MF **A01**
Continental Army Command Fort Monroe VA
Safeguards for the Use of Mines and Explosives in Training.
4 Feb 54, 43p

This memorandum prescribes the general procedures necessary in the detonation of explosives, mines and firing devices used by troops in training. Many of these safe practices are equally applicable in combat. They are applicable from the time of receipt from post, camp or station Ordnance magazines to time of detonation or return to Ordnance control.

AD-A074 243/7 PC **A04**/MF **A01**
Army Infantry School Fort Benning GA
The Fundamentals of Map Reading: A Self-Instructional Text.
Jan 70, 71p

This course is presented to review the fundamentals and theory of map reading. Map reading is a basic military subject but an important one. It is important to a commander, a student, an instructor, and a staff officer. Map reading is important because of the instruction will be based upon the assumption that you know how to read a map.

ED-167 104 Not available NTIS
Bibliographic Retrieval Services, Inc., Scotia, NY.
Revised Phase II Plan for the National Education Practice File Development Project Including: Creation; Pilot Testing; and Evaluation of a Test Practice File. Product 1.7/1.8. Product 1.6 Appended,
Gregory Benson, Jr. Jun 78, 206p
Contract NIE-400-77-0095
For related documents, see IR-006 783-785. Portions of this document are not fully legible.
Available from ERIC Document Reproduction Service (Computer Microfilm international Corporation), Arlington, VA. 22210, PC$11.37, MF$0.83 Plus Postage.

A detailed work plan is presented for the conduct of Phase II activities, which are concerned with creating a pilot test file, conducting a test of it, evaluating the process and input of the file, and preparing the file management plan. Due to the outcomes of activities in Phase I, this plan was revised from an earlier outline. Included in the document is a review of Phase I, an overview of methodological and logistical problems, and a statement of work and technical approach; this latter section is subdivided into areas that discuss the rationale for a simulated clearinghouse, the rationale for content options, project management, and objectives and activities associated with the pilot test file. Appendices present lists of members of the Project Advisory Group and the Internal Project Advisory Committee, the Pilot Test Practice File Design, and the National Institute of Education guidelines for the pilot test.

ED-167 105 Not available NTIS
Vermont State Dept. of Education, Montpelier.
VERB: Resource Base of Materials Uniquely Suited to Rural Schools and Low Budgets.
Final rept.
Feb 78, 23p
Best copy available.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$1.67, MF$0.83 Plus Postage.

Vermont was given a special purpose grant from NIE in 1976-1977 to develop a resource base of materials in education that are uniquely suited to rural schools and low budgets. The goals of establishing a resource system of materials, developing the accompanying indexing and retrieval processes, and publicizing the availability of its resources were reached, as well as a secondary objective of developing and implementing a training program for state department personnel in the utilization and dissemination of information. Two objectives were not met--the provision of computer search capabilities of other data bases, for financial reasons, and the development of a capacity building grant proposal due to insufficient data resources.

ED-167 111 Not available NTIS
New York State Coll. of Agriculture and Life Sciences, Ithaca.
Educational Technology in the Third World: A General Systems Perspective.
Rept. no. 9,
Njoku Awa. 1979, 14p
For related documents, see IR-006 846-851 and ED-162 648.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$1.67, MF$0.83 Plus Postage. Also available from The Communication Arts Graduate Teaching and Research Center, Cornell Univ., 640 Stewart Avenue, Ithaca, NY. 14853 (single copies are free).

Change is more advantageous if it incorporates an entire society rather than an element of that society, and the goals of educational development will be most fruitfully realized with a minimum of harmful effects if programs of instructional development are made to focus on the entire culture, rather than on a single social institution. A systems approach may be extremely important to the educational planner as it emphasizes the need for an integrated approach, recognizing that several factors must be considered together if sound goals are to be met by sound programs. The systems theory paradigm also offers a conceptual tool to the planner whereby a process may be organized into categories, and in so doing may lead to the generation of research, prediction of outcomes, and the encouragemnet of measurement and evaluation.

ED-167 114 Not available NTIS
Highline Public Schools, Seattle, WA.
Highline Public Schools Computer-Assisted Instruction Project: A Program to Meet Disadvantaged Students' Individual Needs for Basic Skill Development.
Final rept.,
Arthur L. Maser. 30 Jun 77, 114p
Portions of this document are not fully legible.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$6.01, MF$0.83 Plus Postage.

This description of a computer-assisted instruction project, which provides an alternative approach to individual instruction in basic skills for economically and educationally disadvantaged students at the secondary level, includes the results of evaluations conducted at the end of each of three school years. Instruction in priority areas--arithmetic, language arts, and reading--was administered to students severely deficient in one or more skill areas in a different manner within each school. Management and student outcome objectives were evaluated by written documentation and data on student pre- and posttests. Data indicate that student use was excellent during the 1974-1975 school year, outcome objectives were met, and response by students, parents, and faculty was generally positive. Management and student outcome objectives in the second year of implementation met or exceeded expectations, student and teacher involvement increased remarkably, and student, parent, and faculty attitudes were especially positive. Objective data for the third year of operation produced the most outstanding results, indicating that the program was highly successful and that computer-assisted instruction is a viable method of building basic skills with eligible students.

ED-167 115 Not available NTIS
Association for Multi-Image, Abington, PA.
The Art of Multi-Image,
Roger L. Gordon. 1978, 147p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$7.35, MF$0.83 Plus Postage. Also available from Publications Dept., Association for Educational Communications and Technology, 1126 16th St. N.W., Washington, DC. ($15.00 for members, $17.50 for nonmembers).

This guide to multi-image program production for practitioners describes the process from the beginning stages through final presentation, examines historical perspectives, theory, and research in multi-image, and provides examples of successful utilization. Ten chapters focus on the following topics: (1) definition of multi-image field and state-of-the-art; (2) history of multiple image in visual arts and research trends; (3) strengths of medium, audiences, and applications in education, business, and industry; (4) organization techniques simultaneous operation of audio and visual components, and physical arrangement of site and equipment; (5) planning and writing the program, with emphasis on design objectives, scripting, and assemblage of audio and visual portions of a storyboard; (6) organization of visual formats, production, composition of visual images, and specific production techniques; (7) physical characteristics, production and recording techniques of audio components; (8) programming of the presentation and background on types of programmers; (9) planning of environment and organization of materials; and (10) methods for critical evaluation of a presentation and explanation of the impact of functional/experimental criticism. Included are appendices of source lists for manufacturers of program control devices, audio recording and playback equipment, related equipment, and multi-image information sources.

ED-167 116 Not available NTIS
Michigan Univ., Ann Arbor. School of Education.
Videotape Project in Child Variance.
Final rept.,
William C. Morse, and Judith M. Smith. 1 Jul 78, 142p
Grant OEG-007602984
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$7.35, MF$0.83 Plus Postage.

The design, production, dissemination, and evaluation of a series of videotaped training packages designed to enable teachers, parents, and paraprofessionals to interpret child variance in light of personal and alternative perspectives of behavior are discussed. The goal of each package is to highlight unique contributions of different theoretical models in the context of realistic classroom behaviors exhibited by those children whose educational needs and behavioral problems require new interpretations and intervention techniques. Each of the five videotape packages comparing and contrasting two perspectives on child variance contains all the materials necessary to operate a two-hour workshop for inservice and preservice teachers. A behavior segment begins each tape followed by discussion of the behavior exhibited, definition of the problem, interpretation of the etiological aspects, and recommended interventions. Six perspectives or models were examined: bio-

genic, psychodynamic, behavioral, sociological, ecological, and countertheoretical.

ED-167 121 Not available NTIS
Manoff International, Inc., Washington, D.C.
Radio, Advertising Techniques, and Nutrition Education: A Summary of a Field Experiment in the Philippines and Nicaragua.
Final rept.,
Thomas M. Cooke, and Susan T. Romweber.
Dec 77, 136p
Contract AID-ta-C-1133
Portions of this document are not fully legible.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$7.35, MF$0.83 Plus Postage.

Infant and child health and nutrition education messages patterned after the reach-and-frequency technique of commercial advertising were broadcast to target groups of young mothers over local radio stations in the Philippines and Nicaragua for one year without the support of more conventional education methods. The messages were developed in consultation with local health and nutrition authorities, recorded using professional talent from local radio stations, pre-tested with representatives of the target audience, and aired according to the listening habits of the target groups. Evaluation data were gathered through questionnaires administered to mothers in their homes in baseline studies, six months after broadcasts began, and 12 months after the baseline. One thousand young mothers were inteviewed in each wave of the interviews. Interviews were supplemented by self-administered questionnaires to doctors, teachers, and other community workers. Results indicated that the broadcasting was successful in improving practices of infant and child health and nutrition care. The reach-and-frequency technique provided a discipline that renders broadcasting to unorganized audiences--the most inexpensive use of radio--effective in bringing about changes in behavior, as well as attitudes and knowledge. Appendices include a household questionnaire, a questionnaire to community workers, a message test questionnaire, a letter to community workers, and examples of the actual radio messages.

ED-167 124 Not available NTIS
Courseware, Inc., San Diego, CA.
SH-2F LAMPS Instructional Systems Development: Phase II.
Final rept.,
Andrew S. Gibbons, and Jonah P. Hynes. Mar 78, 309p NAVTRAEQUIPCEN-76-C-0055-1
Contract N61339-76-C-0055
For related document, see IR 006 833. Portions of this document are not fully legible.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$16.73, MF$0.83 Plus Postage.

This project was one of four aircrew training development projects in a continuing study of the methodology, effectiveness, and resource requirements of the Instructional Systems Development (ISD) process. This report covers the Phase II activities of a two-phase project for the development of aircrew training for SH-2F anti-submarine warfare helicopter pilots and sensor operators. Instructional materials were authored and subjected to a review process, produced in a tryout form, and subjected to a tryout with typical students. When all materials had been tried out and produced in final form, the instructional systems was implemented at two sites. An instructor training course was developed and implemented to train instructors in specific tasks attendant to implementation of the system. It was concluded that the ISD model used was robust, and produced instructionally effective materials. Data on the personnel requirements were gathered and reported. A review of the effectiveness of the instructional development model was made on a step by step basis and suggestions for the future implementation of ISD in the Navy were made.

ED-167 125 Not available NTIS
Indiana Univ. at Fort Wayne.
Audio-Tutorial Minicourses for College Algebra and Trigonometry: A Progress Report,
Rudy G. Svoboda. 1978, 27p
Grant NSF-SER77-02454
Portions of this document are not fully legible.
Available from ERIC Document Reproduction Service (Computer Microfilm international Corporation), Arlington, VA. 22210, PC$2.06, MF$0.83 Plus Postage.

Preliminary results are reported for courses in college algebra and trigonometry based on the Postlethwait audio-tutorial minicourse system which were developed at Indiana University-Purdue University at Fort Wayne (IPFW). Two IPFW faculty members, two secondary teachers, and two undergraduate mathematics majors formed a minicourse project team supported by a National Science Foundation Grant with each team member responsible for authoring a number of minicourses, i.e., writing study guides, designing art work in the study guides, developing the tape scripts and preparing the manuscripts for duplication. Although one individual was responsible for a given minicourse, the end product was a team effort. Instruction was designed to involve students actively in three different types of study sessions--independent study, weekly general assembly sessions, and integrated quiz sessions for small groups. The study guide for the minicourse on exponential functions in included.

ED-167 126 Not available NTIS
Bolt, Beranek and Newman, Inc., Cambridge, Mass.
An Investigation of Computer Coaching for Informal Learning Activities,
Richard R. Burton, and John Seely Brown. Aug 78, 35p BBN-3914
Contract MDA903-76-C-0108
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$2.06, MF$0.83 Plus Postage.

This paper provides an in-depth view of computer based tutoring/coaching systems and (1) the philosophy behind them, (2) the kinds of diagnostic modeling strategies required to infer a student's shortcomings from observing his behavior, and (3) the range of explicit tutorial strategies needed for directing the tutor to say the right thing at the right time. Examples of these issues were drawn for a computer based system for a simple game--How the West Was Won. The intention was to make explicit the vast amounts of tutorial knowledge required to construct a coaching system that is robust, friendly, and intelligent enough to survive in home or classroom use.

ED-167 173 Not available NTIS
Non-Print Media Storage, Retrieval and Display--Systems for Libraries and Education,
W. Marc Ducker. 1977, 55p
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$3.50, MF$0.83 Plus Postage.

This paper presents a summary of the current state of the art in nonprint information systems, as well as an overview of potential developments with emphasis on educational applications. While most libraries and educational institutions today have become somewhat nonprint oriented, there are wide differences in utilization among institutions. Examination of simple delivery systems, such as traditional library loan and radio and television broadcasting, indicate the potential to become more user-responsive. Specialized delivery systems (communications media) play as much of a role in shaping complex information systems as their storage, retrieval, and control devices. It is only with the advent and spread of narrowcasting wired systems, and computer and satellite data transmission that some of the more complex information systems have become viable. Present nonprint information storage and retrieval systems, including microform and nonprint libraries and data banks, have various applications calling for different combinations of systems. Anticipated technological advancements for these systems indicate a broad potential for educational applications. A timetable of predictions for future development is included.

ED-167 174 Not available NTIS
Staff Training for On-Line Processing Systems,
Pauline F. Micciche. May 78, 30p
Paper presented at the Mid-Year Meeting of the American Society for Information Science, Houston, TX, May 21-24, 1978.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$2.06, MF$0.83 Plus Postage.

Library staff training methods and training manual construction should be part of the overall implementation plan for an online processing system. An effective training program to introduce staff to the new system and increase confidence in it would aid in efficient implementation. A manual consisting of a detailed outline of the training plan and copies of all materials to be used should be developed prior to training sessions. Goals should be clear in terms of a minimal level of achievement given appropriate conditions. Experience and job level of the staff being trained should determine the structure of the training program, and materials should be presented in a sequence meaningful to the staff; different presentation methods and appropriate teaching aids should be used to match the learning patterns of as many staff as possible. Training would be evaluated both after a settling-in period, by participants and instructor questionnaires and by trainee quizzes and tests, in terms of its success in meeting stated goals. Follow-up sessions would be used to help eliminate misunderstandings and reinforce previous training.

HRP-0025661/0 Not Available NTIS
Health Planning Forces Tough Decision.
Gerard P. Boe. 1978, 2p
Pub. in Health Services Manager v11 n2 p4-5 Feb 78.

The dean of the University of Oregon Health Services Center School of Nursing made a decision to turn down Federal capitation money amounting to about $150,000 in order to pursue goals based on projected health needs in the State. A national projection model was adapted for State use and used to determine the current and future nursing needs in Oregon. This study showed that the supply of nurses about equals demand and that continuation of current graduation levels in nursing over the next 10 years would result in 50 percent more nurses in the State than at present. Even allowing for new nursing roles and population increases, a severe employment problem could be expected. About 90 percent of the nurses educated in Oregon stay in the State to practice. The distribution of nurses in Oregon is a major problem, however: while Portland is oversupplied, many rural areas are seriously undersupplied. In response to this need, the University of Oregon Health Services Center School of Nursing will educate 20 students in each of the sophomore, junior, and senior classes in a rural area in the eastern part of the State. Turning down the Federal money resulted in much less money to operate the school than in previous years. The faculty were involved in every stage of the decision to turn down the money and in budget planning necessitated by that decision. Cutbacks in faculty and staff were achieved through attrition. In order to avoid interdepartmental rivalry and conflict over budget allocations, each department received a salary budget based on a set average salary for the number of faculty in the department.

HRP-0026759/1 Not Available NTIS
Massachusetts Coll. of Pharmacy, Boston.
Toward Formalized Curricula in Continuing Professional Education.
Coleman M. Herman, and Edward J. Kabloski. 1978, 5p
Pub. in the American Jnl. of Pharmacy v150 n1 p28-32 Jan-Feb 78.

An approsch toward formalized curriculums in programs in continuing education for pharmacists is outlined. Some instructional formats currently in use for such purposes, such as short-term seminars or long-term lecture series, have not proven successful. Formats designed to provide more structure, depth, and continuity to continuing pharmaceutical and medical education are suggested. They may include a 30-week therapeutic course, postgraduate traineeships, evening master's degree programs, back-to-school programs for practicing physicians and pharmacists, and specialized programs for specific populations and pro-

fessional groups. Objectives which are developed as goals for such programs and the measures by which they may be evaluated are described. They include cognitive, affective, and psychomotor objectives, with evaluation as an integral educational process. General eduational principles are reviewed in terms of their applicability to continuing education in pharmacy, including the concept that learning responsibility belongs primarily with the student, although program designers are charged with making educational programs relevant to the personal needs and life situations of participating students. It is concluded that of all the health professions, pharmacy is most in need of structured continuing education.

HRP-0026783/1 Not Available NTIS
Residents.
1978, 11p
Pub. in Medical Newsmagazine v22 n7 p89-99 Jul 78.

The development and current status of the hospital residency is discussed. The resident physician functions in a variety of roles: postdoctoral student, teacher of newer graduates and undergraduates, head of a medical-technical-nursing team, investigator doing clinical research, physician engaged in patient care, hospital employee, and union member. Until recently, there were not enough residencies available for the number of physicians graduating. As this problem was met and mostly resolved by a clearinghouse matching program for hospitals and physicians, the problem of rising costs for hospital training and services began to dominate the scene. The resident internship has come to include broad clinical experience during the first year before specialization. Also, there is increasing interest in primary care residencies on the part of physicians who plan to work as family practice physicians. Such innovative programs as the residency in social medicine at Montefiore Hospital, Bronx, N.Y., and the Central Maine Family Practice residency program are described. Other program changes include shorter working hours, higher pay, and some resident control over program management. It is concluded that the changes in resident physician programs will produce changed physicians and medical practices to match modern medical concepts.

HRP-0026812/8 Not Available NTIS
Incarnate Word Hospital, St. Louis, MO.
Nursing Care Plans for the 'Older' Graduate.
Cheryl A. Coffman. 1978, 2p
Pub. in Supervisor Nurse v9 n7 p66-67 Jul 78.

Techniques for inservice training of experienced nurses in writing care plans are discussed. Instruction should begin with a lecture on the function of care plans as a blueprint for patient-centered nursing care. The elements are: actual, possible, or potential problems with causes; expected outcomes; and nursing orders detailing such actions as administering medications according to the physician's orders, questioning patients about food likes and dislikes, placing patients on intake and output when nausea persists, and notifying the physician in case of fluid imbalance. Further instruction steps include writing sample care plans, discussing means of evaluating patients' progress and of documenting evaluation in the nursing notes, and outlining procedures for daily updating of care plans. It is maintained that teaching nurses to write logical care plans will make the plans a valuable and effective part of the nursing process. One sample of a care plan is provided.

HRP-0026818/5 Not Available NTIS
Sackler School of Medicine, Tel-Aviv (Israel).
Multi-Applications to Nursing Education Programs in Israel -- Facts and Issues.
R. Bergman, R. Ron, A. Rotenberg, R. Sharon, and L. Zwanger. 1978, 8p
Pub. in International Jnl. of Nursing Studies v15 n2 p83-90 1978.

The results of a 1975-76 study of applications to Israeli nursing schools were examined to establish why schools were underutilized despite a large number of applicants. The data was derived from 1,764 applications to 14 nursing schools, from interviews with school directors, and from questionnaires to nonstarters and written followups from starters. The findings showed that 296 of the applicants applied to more than one school, that multiple applicants tended to be younger (18 to 19 years old), single, and female, that multiple applications improved the applicant's chances of admission, that while the number of admissions per student was not relevant, more rejections were correlated to lower success rates, and that the attrition rate of single school applicants was considerably lower than that of multiple applicants. It was concluded that considerable resources were wasted on multiple applications and that some schools were left with vacancies by candidates who went elsewhere. Recommendations for improvement included examination centers throughout the country to avoid duplication in testing, advisement centers to help students select appropriate schools, establishment of a central registry, and early identification of both voluntary attrition and termination groups. A list of definitions and four tables are furnished.

HRP-0027223/7 Not Available NTIS
Richland Memorial Hospital, Columbia, SC.
Train. Who. Me.
Michael K. Jones. 1978, 6p
Pub. in Hospital Topics v56 n4 p31-35, 37 Jul-Aug 78.

Departmental hospital training is discussed as a primary supervisory function which increases work force efficiency. Training needs are assessed through such resources as questionnaires, trends in literature, various guidelines, discussions with employees and supervisors, and technical manuals. Needs should be listed, specific behavioral changes set as goals, and priorities constantly reevaluated. A format is selected (job instruction training, films, coaching, role playing, apprentice training, conference/discussion, programed instruction, internship, case study, lecture, simulation, job rotation, programed group exercises) and a course outline and aids are developed. Actual training requires a training area, procurement of audiovisual equipment, and notification of trainees 3 to 6 months in advance. Training is evaluated by the instructor (methods and effectiveness), by trainees (self-evaluation), and by the supervisor (assessment of attitudinal or behavioral change). The 19?7 training schedule for Housekeeping Services of the Richmond Memorial Hospital in Columbia, S.C., illustrates an effective program with orientation of new housekeeping personnel, continued training in technical aspects of housekeeping, and supervisory training for the housekeeper.

HRP-0027224/5 Not Available NTIS
California Univ., Los Angeles.
Training Family Planning Personnel in Sex Counseling and Sex Education.
Susan Price, Joshua Golden, Margaret Golden, Terri Price, and JoAnn Leff. 1978, 7p
Pub. in Public Health Reports v93 n4 p328-334 Jul-Aug 78.

To provide the assistance desired by 4 of 10 family planning patients in a Los Angeles clinic survey, a low-cost, 1-year pilot program for physicians, nurses, counselors, health educators, and volunteers was sponsored by the Los Angeles Regional Family Planning Council. The program consisted of five stages: 1) a 2-day introduction with films, discussions, and basic information, 2) ten 2-hour lectures on diagnosis and treatment of sexual problems, as well as demonstration of counseling techniques, 3) weekly or bimonthly case supervision of interested staff by project consultants, 4) presentation of education programs by trainees for both staff and patients (teen 'rap' sessions, programs for parents), and 5) trainee-designed lecture series and supervision programs. The advantages of the five-stage model were that the trainee determined the target training level and that diverse information sources could be tapped for a large group. A followup survey of 49 trainees who participated in at least stage two showed that over 90 percent had provided information or counseling, including all of staff who had previously never done so, that trainees were more comfortable with sexuality, and that successful counseling required weekly case supervision (stage three). The trainees' competence in educational and counseling services could not be systematically assessed, but appeared adequate to observers. Problems encountered, e.g., funding cutbacks, are discussed. Evaluation of questionnaire data is provided in two tables.

HRP-0027350/8 Not Available NTIS
Continuing Education -- An Approach Toward Structure and a Call for Help.
Stuart A. Wesbury, John E. Mosher, and Michael A. Sachs. 1978, 11p
Pub. in Hospital and Health Services Administration v23 n3 p68-78 Summer 1978.

Despite almost unanimous recognition of the need for continuing education in the health field and already existing mandatory requirements in some States, a clear and comprehensive taxonomy of continuing education modalities is lacking. This paper addresses this need, describing a taxonomy which goes beyond formal programs and conferences to include the community and informal activities of the health administrator. In order to test the taxonomy, a questionnaire was sent to 32 clinical faculty and preceptors affiliated with the University of Missouri-Columbia Graduate Program in Health Services Management; of those, 23 questionnaires were returned in time to be summarized. The results revealed a heavy preference for interactive programs of short duration. This group of respondents indicated very few barriers to continuing education activities. Ninety-five percent reported that they were within 1 hour's travel time of a university with continuing education programs in the health field and that their institutions reimbursed expenses related to such education, and provided administrative staff with paid time off for such activities. The primary motivation cited for seeking more education or training was to meet changing demands of a present position. Because continued education of health administrators must be assured, continued research in this area is needed.

HRP-0027624/6 Not Available NTIS
Thomas Jefferson Univ., Philadelphia, PA. Coll. of Allied Health Sciences.
Case of the Missing Ladder.
Fred R. Petrone. 1978, 8p
Pub. in Jnl. of Continuing Education in Nursing v9 n4 p8-15 1978.

The need for establishment of continuing education programs leading to baccalaureate degrees for working registered nurses (RN's) is advocated. It is argued that baccalaureate nursing programs have been unwilling to facilitate career advancement of RN's by accommodating them with special courses and hours, thus contributing to RN's career immobility and forcing them to seek baccalaureate degrees outside nursing. The situation results from overlapping of the three types of nursing programs without any attempts at articulation or accreditation standards which might encourage articulation. It is recommended that the three types of nursing educators work together. All National League for Nursing (NLN) teams should consist of faculty representatives of all nursing levels, any revision of criteria for accrediting baccalaureate programs should mandate implementing mobility procedures, and the three educational councils of the NLN for the three levels should merge into a council of nursing education which issues policy statements coordinating the interests of all nursing levels. Two tables are provided.

HRP-0028445/5 Not Available NTIS
Harvard Univ., Boston, MA. Interfaculty Program in Medical Ethics.
Ethics in the Nursing Curriculum.
Mila Ann Aroskar. 1977, 5p
Pub. in Nursing Outlook v25 n4 p260-264 Apr 77.

The inclusion of ethical issues and problems in nursing curriculums was the focus of this study. Questionnaires were sent to deans or curriculum coordinators in 209 accredited baccalaureate nursing programs in the United States; 86 returned the questionnaire. Six programs had faculty members who spent half or more of their time teaching ethics. Only six programs required a course in medical ethics or a more broadly based course in ethics. One school had a modular self-paced curriculum; some of the modules dealt specifically with ethics. Two-thirds of the programs indicated that ethical aspects of nursing were integrated throughout all courses. Slightly more than half of all programs did not note planned student contact with ethical issues through elective courses, symposia, and workshops. Only two programs failed to identify any courses including informal discussions

of ethical problems. Regarding teaching materials, 32 percent of the programs indicated that audiovisual materials were used and 20 percent reported that case study techniques were employed. Almost half felt that these materials would be helpful, and 25 percent said that a basic nursing ethics text would be beneficial. The following ethical issues, in order of priority, were identified by respondents: professional code of ethics, ethical theories, values clarification, patients' rights and obligations, families' rights and obligations, informed consent, and truth telling. Their implications for nursing curriculums are discussed.

HRP-0028448/9 Not Available NTIS
Gwynedd-Mercy Coll., Gwynedd Valley, PA.
Distinguishing Between Associate Degree (AD) and Bachelor of Science (BS) Education.
Ellen Michelmore. 1977, 5p
Pub. in Nursing Outlook v25 n8 p506-510 Aug 77.

Distinctive characteristics of associate degree (AD) and baccalaureate educational preparation for nurses and differing practice competencies are investigated. In light of opposing views regarding whether differences in AD and baccalaureate programs actually exist, a program was planned at one college in which AD and baccalaureate levels had distinct content characteristics. Nurses in the program are prepared with identifiably different competencies, while a program structure is maintained that continuously builds on the previous nursing preparation of students. The design of the curriculum is based on concepts of national health problems, the nursing process, and transfer of educational experiences into nursing practice. Baccalaureate nurses are more proficient in the use of the nursing process than AD nurses who complete the program. In general, simple versus complex nursing content can be used to differentiate AD and baccalaureate education, e.g., AD nurses are prepared to provide selected aspects of care for all patients and baccalaureate nurses are prepared to provide all aspects of care for selected patients. The ability to solve problems is cited as one point of comparison. Differing practice competencies of each type of nurse are listed. The differentiation of nursing content for students at different levels of educational preparation is considered to be an issue that can be resolved by careful planning and commitment to the translation of nursing content into nursing practice.

HRP-0028517/1 Not Available NTIS
California State Univ., Los Angeles. Dept. of Nursing.
Granting Credit for Previous Learning.
Ruth Wu. 1978, 6p
Pub. in Nursing Outlook v26 n11 p707-712 Nov 78.

This article discusses the implications of accepting credit from accredited community college and diploma nursing programs for baccalaureate programs. A distinction is made between blanket and transfer credit and between challenge and entrance or screening examinations. Blanket credit involves awarding credit for nonequivalent course work. Credit by examination involves registered nurses who seek advanced standing in baccalaureate programs. Blanket credit is viewed as the least acceptable mechanism and transfer credit is sometimes questionable. Credit by examination, therefore, is the most widely accepted approach. The acceptance of transfer credit from community college and diploma nursing programs raises certain philosophical issues about the quality of baccalaureate nursing programs employing such practices. The solution developed at the California State University at Los Angeles is to give transfer credit for equivalent course work. This approach recognizes that challenge examinations are the preferred validating mechanism but that a systematic review of course objectives, outlines, and bibliographies from accredited nursing programs is equally appropriate. The decision of the university to place 24 credits of nursing content formerly included in the upper division into the lower division of the nursing program has facilitated transfer credit for registered nurse students and has obviated the need to challenge upper division courses. The decision has also allowed the university to include and expand upon nursing content believed to be representative of upper division professional nursing content.

HRP-0028519/7 Not Available NTIS
Union Theological Seminary, New York.
Educational Model for Geriatric Nurse Practitioner Curricula.
Martha L. Henderson, and Mary Quinn Penta. 1978, 4p
Pub. in Jnl. of Gerontological Nursing v4 n6 p53-56 Nov-Dec 78.

Phases in a curriculum model for geriatric nurse practitioners (GNP's) are described. In ambulatory and inpatient settings, GNP's take medical histories, perform physical examinations, order diagnostic tests, assess patients' conditions, and decide if they can treat a patient independently. With regard to the educational model, physicians who supervise student preceptorships and sponsoring organizations should understand the GNP role and the part GNP's play in training. The 1-year curriculum for GNP's is divided into a 6-month didactic phase on campus and a 6-month preceptorship phase in the practice setting. Modules in the didactic phase concern data collection (history taking, physical assessment, problem-oriented medical records, and quality assurance evaluation), common health problems, adult medicine, and geriatrics and gerontology. Seminars and clinical experience are part of the didactic phase. The preceptorship phase involves the integration of medical and nursing aspects of patient care and embodies continuing education and evaluation. At the end of both phases, an examination is administered to test the ability of students to solve problems in simulated clinical situations. An outline of the geriatric module is included. It deals with common health problems of the elderly, psychosocial aspects of aging, and methods of nursing intervention.

HRP-0028598/1 Not Available NTIS
Creighton Univ., Omaha, NE. Coll. of Nursing.
New Concept of Teaching-Learning Experience in Trauma Nursing.
Judy Bell, and Margaret Miller. 1977, 5p
Pub. in the Jnl. of Continuing Education in Nursing v8 n6 p22-26 1977.

Development of a 30-hour emergency medical care inservice nurse training program for nurse trainers in rural Nebraska is described. The course planning committee consists of six emergency medical service area representatives. The teaching approach used is individualized and self-instructive to accommodate the special farmwife-nurse situation and to allow learners to work at their own speeds. The major module topics chosen represent principal emergency situations found in the State: assessment, establishment of priorities, stabilization, initial management, transfer methods, and recordkeeping. The content areas covered are the unconscious patient, the patient with spinal cord trauma, and the patient with an orthopedic emergency. The learning resources available are reference books, filmstrips, printed case studies, and slide/tape programs. Demonstrations of various teaching methods prepare students for a microteaching experience on the final workshop day. Emphasis is placed on participation, skill practice, and group problemsolving. Pretests and posttests are built into each module for evaluation. The modules are adaptable and have been rated as relevant by participants, although 30 instructional hours over 4 days is generally deemed too intensive. Development of further modules is planned. A map of emergency medical service areas is supplied.

HRP-0029679/8 Not Available NTIS
Wisconsin Univ.-Madison. School of Nursing.
Nursing Practice Decisions in Emergencies -- A Course and How It Was Designed.
Joy D. Calkin, and Mary W. Gulbrandsen. 1978, 8p
Pub. in Jnl. of Nursing Education v17 n9 p30-37 Nov 78.

A course at the University of Wisconsin School of Nursing (Madison) that deals with nursing practice decisions in emergencies is reported. The course is being implemented on a trial basis for one semester and results in three credits. There is also a separate laboratory course of one credit which may be taken with or following the content of the course. Training in basic emergency care skills and cardiopulmonary resuscitation is provided in the one-credit laboratory experience. The units of the three-credit course focus on the planning process (needs, strategies for achieving goals, outcomes, physical environment, organizational environment, human resources, equipment resources, and information resources), planning strategies (determining functions, developing an ideal system, gathering information, suggesting alternative solutions, selecting one solution, formulating a system to implement, reviewing the system, testing the system, implementing the system, and measuring and controlling the system), nursing intervention in generic crises, selected medical and traumatic emergencies, and transfer of educational skills to other course content and nursing practice. Procedures followed in developing and implementing the course are described.

HRP-0029682/2 Not Available NTIS
Anoka-Ramsey Community Coll., Coon Rapids, MN.
Peer Review of the Nurse Educator -- The Process and Development of a Format.
Shelley Page, and Jennifer Loeper. 1978, 9p
Pub. in Jnl. of Nursing Education v17 n9 p21-29 Nov 78.

The peer review tool described and included in this article is based on two basic elements of peer review for nurse educators (direct observation and feedback). Peer review is important to nursing not only in terms of nursing practice but also in terms of nursing education's accountability to the nursing profession and consumers. Peer review can contribute to the total process of teacher evaluation, but feedback is important since peer review represents an opportunity for teachers' growth. In developing the peer review tool, it was necessary to deal with problems related to behavior observation. Two modes of observation were found in the literature: (1) watching what people do and say; and (2) asking people about their own actions and the behavior of others. The peer review tool focuses on seeing and hearing events and observing the behavior of other teachers. A five point rating scale is employed to evaluate parameters of nursing activities and requisite skills. The tool was tested and, for the sample groups used, proved to be both reliable and valid. Because of the small sample size used in testing, however, the results cannot be generalized. Use of the tool in other situations involving teacher-student interactions is planned, and a followup questionnaire dealing with the usability of the tool, the value of behaviors (activities) in the tool, and feedback information has been constructed.

HRP-0901401/0 PC **A06**/MF **A01**
American Association for Respiratory Therapy, Dallas, TX.
Development of Individual, Independent Study Packages. Subproject V.
May 78, 102p
Contract PHS-HRA-231-75-0213
See also Subprojects I-IV, HRP-0901397 -- HRP-0901400, Subproject VI, HRP-0901402.

This document contains an individual and independent study package (IISP), a preassembled unit designed to provide a learning opportunity for respiratory therapy practitioners. Items to consider in the critique of an IISP are behavioral objectives, directions for use, the instructional package, and whether the package meets a learner's needs. Four major functions of the IISP as a prescribed learning system include maintenance, evaluation, prescription formulation, and learning resources delivery. Recommendations pertinent to rationale, specification, appropriateness, effectiveness, condition, practicality, and dissemination aspects of the IISP are offered. A list of developed IISP's is included, with topics encompassing roentgenology, classification of mechanical ventilators, transpulmonary pressure changes in breathing, resistance to ventilation, pulmonary function assessment, body plethysmography, practical application of gas laws, tonicity of solutions and the respiratory tract, respiratory management of neuromuscular crises, carbon monoxide inhalation, sources of error in blood gas analysis, temperature correction for arterial blood gas analysis, ventilation/perfusion, tracheal intubation, microbiology, respiratory management of head trauma, and electrical safety in respiratory therapy. A bibliography is provided. Appendixes contain a questionnaire for use in a needs survey, criteria for selection of topics for an IISP, and other information on the development of the IISP.

PB80-100126 PC **A04**/MF **A01**
Small Business Administration, Washington, DC.
Petite Entreprise - La Gestion du Personnel (Personnel Management Guide for Small Business),
Ernest L. Loen. Feb 61, 64p SMALL BUSINESS MANAGEMENT SER-26
Text in French. Sponsored in part by Agency for International Development, Washington, DC.

The importance and difficulties of obtaining good personnel for a small business, are discussed in this translation of an English publication titled 'Personnel Management Guide for Small Business'. Various brochures, relative to the subject matter under discussion, are listed in the text. The following topics are discussed: Hiring of personnel: Ways of recruiting, selecting, testing, obtaining references from and interviewing personnel. Standard employment forms are included. Training of personnel--Setting up a training program, promotion training, group training, training of specialists; Renumeration--Salaries, gratuities, pension plans, vacation, sick leave, paid holidays and insurance are discussed; Work milieu and Social services--included are social services, recreation and financial aid; Relations with personnel--Discusses factors other than salary, necessary to retain personnel--job safety, advancement possibilities, open communication and complaint possibility; and Relations with unions--Collective bargaining, union contracts.

PB80-100316 PC **A10**/MF **A01**
Bureau of Labor Statistics, Washington, DC.
Comment Faire une Enquete sur la Main-D'Oeuvre (Conducting a Labor Force).
Sep 64, 209p
Text in French. See also English version, PB-183 126. Sponsored in part by Agency for International Development, Washington, DC.

The report explains how to organize a survey of manpower resources in developing countries. It includes recruiting and training of persons to conduct such surveys.

PB80-101215 PC **A02**/MF **A01**
Dunlap and Associates, Inc., Darien, CT.
First Responders Emergency Medical Care Training CIM Course Revision.
Final rept. Oct 77-Nov 78,
Arlene M. Cleven, and Edward W. Bishop. Nov 78, 25p ED-78-10, DOT-HS-805 047
Contract DOT-HS-7-01731
See also HRP-0014296.

In 1973, NHTSA published a training program in emergency medical care for the first person to respond to a traffic accident. It was titled Crash Injury Management for Traffic Law Enforcement Officers and came to be known as the CIM course. This study involved revision of the CIM program to ensure that it is up to date from the point of view of both technical content and instructional strategy. The contract specified that the name of the program be chaged to First Responder: Emergency Medical Care Training Course. Suggestions for the revision effort were obtained from users as well as NHTSA expert reviewers. A reference text in emergency medical care served as a standard for the technical contents of the course; all basic life support procedures were checked with the American Heart Association. The revised course design includes 28 lessons (including one optional lesson) involving a minimum of 40 hours of training time. As with the original CIM course, the curriculum package includes an Instructor's Lesson Plans document, a Student Study Guide and a Course Guide. All three documents received a complete technical update. In addition, the Student Study Guide was expanded to include specific patient assessment and emergency care procedures.

PB80-101439 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Federal Personnel and Compensation Div.
Federal Agency Standards of Employee Conduct Need Improvement.
Report to the Congress.
18 Oct 79, 76p FPCD-80-8

In a review at six Federal agencies, GAO found that the basic philosophy underlying the application of standards of employee conduct places the primary burden of responsibility on employees to know and abide by standards, while agencies assume a passive role usually only reacting to employee initiatives. The report identifies problems and makes recommendations with respect to (1) negotiating for employment, (2) accepting honoraria, (3) outside employment activities, (4) accepting gifts and gratuities, (5) accepting travel reimbursement from private sources, and (6) resolving financial conflicts.

PB80-101561 PC **A04**/MF **A01**
Texas Univ. at Austin. Center for the Study of Human Resources.
The RTP/Arkansas State Employment Service Demonstration Project.
Final rept. 21 Apr 77-31 Dec 78,
Paula S. Greenfield. 16 Oct 79, 61p DLETA-20-36-77-13-1

The RTP/Arkansas State Employment Service Demonstration Project was a two-year demonstration project designed to test the feasibility of applying the 'outreach strategy' within the framework of the Arkansas State Employment Service. The central issue in the 'outreach strategy' is the formation of a organization limited in staff and scope, to provide a link between the minority community and employers. The focus of the project was on developing employment and training opportunities for minority women and men in managerial, professional and technical jobs in both the private and public sectors.

PB80-102098 PC **A02**/MF **A01**
Council of State Governments, Lexington, KY.
Innovations, Permanent Part-Time Employment: A Staffing Option for State Government,
J. Jarrett. Aug 78, 12p RM-648, NSF/RA-780650
Grant NSF-ISP77-16111

Advantages and disadvantages of part-time employment in state government are reviewed in light of increasing interest in expanding part-time employment opportunities. Principal advantages are greater flexibility in shifting personnel to meet changing needs, expanded service to the public, retention of experienced employees who can no longer work full-time, recruitment of workers from a different labor pool, and frequently, higher productivity. Drawbacks include increased administrative support and fringe benefit costs and lack of employee commitment to the agency. Maryland and Massachusetts have established formal programs encouraging expansion of part-time employment which provide fringe benefits such as annual leave, health insurance, and tuition reimbursement. Employment rights are clearly delineated. Part-time employment in these programs has increased but at a slower rate than anticipated because of supervisory resistance and restraints on expansion of government employment. The programs in both states have proven beneficial when employment is geared to the characteristics of job tasks and an agency's needs. Employee productivity normally more than compensates for slightly higher fringe benefit costs.

PB80-102296 PC **A04**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC. Center for Educational Research and Evaluation.
Manual on Program Operations for the Visiting Women Scientists Program,
Iris R. Weiss, and Larry E. Conaway. Aug 79, 68p RTI/1481/00-05F
Contract NSF-SPI77-21262
See also PB-300 830.

The Visiting Women Scientists Program was conducted by the Research Triangle Institute under contract to the National Science Foundation. Its purpose was to motivate women students at the secondary level to consider careers in science and technology. The program consisted of visits by 90 women scientists and 7 trained RTI field representatives to 247 junior and senior high schools across the United States during the 1977-78 and 1978-79 school years. The purpose of the Manual on Program Operations is to share the experience gained in conducting the program with others who may wish to design and conduct similar programs. It was written to do the following: present an overview of the program; describe program materials and procedures; discuss procedures and materials which were discontinued or revised; and recommend steps to avoid potential problems.

PB80-102528 PC **A07**/MF **A01**
Office of Technology Assessment, Washington, DC.
Computer Technology in Medical Education and Assessment.
Background rept.
Sep 79, 142p OTA-BR-H-1
Library of Congress catalog card no. 79-600146.

The report describes the technologies and strategies for computer-based education and assessment, the current state of medical education and assessment activities, and computer applications in medicine. It also provides examples of systems for the development and dissemination of computer-based educational materials. The Federal Government role in computer-based education and assessment has been primarily in the research and development phases. However, the medical areas in which such computer-based methods have been applied have been of long-standing interest to the U.S. Congress. Such areas include health professions education, monitoring and evaluating physician services through Professional Standards Review Organizations (PSROs), and efforts to contain the costs of such federally financed programs as Medicare and Medicaid. In all these areas the use of computer technology is becoming the rule rather than the exception. This report examines these computer applications in various stages of the life-long process of medical education from entry into medical school through active practice.

PB80-102650 PC **A05**/MF **A01**
Office of Personnel Management, Washington, DC. Personnel Research and Development Center.
The Validity of Tests Used to Select Clerical Personnel: A Comprehensive Summary and Evaluation.
Technical study (Final),
Kenneth Pearlman. Aug 79, 95p TS-79/1

The report presents summary compilations of criterion-related validity results for ability and performance tests as predictors of job proficiency and training success in clerical occupations, based on a review of some 60 years of published and unpublished research. These results are evaluated in terms of both the relative mean validities of different types of tests for different clerical or jobs or job families and the generalizability of these mean validities.

PB80-103971 PC **A06**/MF **A01**
Office of Education, Washington, DC.
Selected Bibliography of Egyptian Educational Materials: Volume 4, Number 1, 1978.
1979, 101p TT-78-59141/1
See also Volume 3, Number 3, PB-291 220-T. The above journal is translated on a regular basis. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

A bibliography of educational materials in Egypt cites publications dealing with various phases of academic and technical training. Abstracts are presented of books and articles on organization, faculties, students, and teaching methods. Other topics are administration, testing, illiteracy, textbooks, social aspects, objectives, and higher education.

5J. Psychology (Individual and Group Behavior)

AD-A073 924/3 PC **A04**/MF **A01**
Naval Postgraduate School Monterey CA
Prediction of Navy E-4 Test Passers.
Master's thesis,
Edwin Franklin Beach. Sep 79, 56p

This thesis applies hierarchical clustering and quadratic discriminant function techniques to the problem of predicting E-4 test passers and non-test passers (including non-test takers) in the Navy. The biographic data base includes items such as test scores and education to serve as separators and predictors in the techniques. The clustering of

rates permitted accumulation of personnel in the lightly staffed ratings into similar groups of substantial size, was objective, and may be useful for purposes other than the present one. The discriminant analysis produced correct classification rates of about 60 to 70 percent based on the data at hand. (Author)

AD-A074 002/7 PC **A08**/MF **A01**
RAND Corp Santa Monica CA
Human Processing of Knowledge from Texts: Acquisition, Integration, and Reasoning.
Interim rept.,
Perry W. Thorndyke, Barbara Hayes-Roth, Susan Knobel, James Miller, and Carol Walker. Jun 79, 168p Rept no. RAND/R-2256-ARPA
Contract DAHC15-73-C-0181, ARPA Order-1891

Decision makers must frequently assimilate a large number of facts from several documents, organize related facts in memory, and reason using the acquired knowledge. Nine experiments investigated how people learn and retain knowledge in texts and perform inferential reasoning (using several facts to generate or verify conclusions). Individual experiments examined the influence of text structure, the learnability of individual facts, the acquisition of new knowledge conforming to a previously learned structure, the integration of related but separately learned facts in memory, search and verification processes for inferential reasoning, and techniques for improving the organization of information in memory.

AD-A074 072/0 PC **A02**/MF **A01**
Washington Univ Seattle Dept of Psychology
Uncertainty and Decision Making.
Final rept. 1 Oct 77-31 Aug 79,
Terence R. Mitchell. 1 Sep 79, 20p Rept no. TR-79-19
Contract N00014-76-C-0193

This final report on 3+ years of research reviews studies in the causes of uncertainty, theoretical developments in uncertainty, the consequences of uncertainty and the applications of theory to uncertain situations. Further, work on a contingency model for selection of decision strategies is outlined and related research is described. (Author)

AD-A074 086/0 PC **A09**/MF **A01**
Johns Hopkins Univ Baltimore MD Dept of Psychology
A Study of Meeting and Conference Behavior.
Technical rept.,
Mark Allan Brecht, and Alphonse Chapanis. Jul 79, 200p Rept no. TR-8
Contract N00014-75-C-0131
Doctoral thesis.

The behavior of participants and the events that occurred in 48 academic, business, and government meetings were recorded using observational techniques and a participant questionnaire. The data that were obtained from a large number of dependent variables provide a great deal of detailed, descriptive information about face-to-face meetings in general and about their associated communication activities. Among other things, the data document: (1) how and why the meetings were conducted; (2) when, where, and for how long the meetings were held; (3) the pattern and nature of communication interactions among participants; and (4) the use made of supplemental communication aids such as audio-visuals and graphics. Three distinct types of meetings--small, medium, and large--were identified and shown to differ in complexity and communication characteristics. Implications of these and other observed differences among meeting for tele-conferencing system design are discussed.

AD-A074 101/7 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington DC
Effects of Acute Sleep Loss on Performance,
Harold L. Williams, and Ardie Lubin. 8 Jan 58, 23p

No abstract available.

AD-A074 164/5 PC **A05**/MF **A01**
Army Military Personnel Center Alexandria VA
The Relationship of Managerial Intelligence and Experience to Behaviors under Stress.
Final rept.,
Jeffrey Wayne Anderson. 30 Jul 79, 76p
Master's thesis.

This study investigates the impact of intelligence and experience on the behaviors of Army squad leaders, as well as the degree to which these relationships are moderated by the leader's perceptions of stress in his work group and with his boss. In general it is found that the behavior of the leader under stress and the relationship of his intelligence and experience remain unclear, however, the leader does appear to change his perceptions of the leadership situation in response to his perceived stress. Leaders saw the job as more valuable or worthwhile if there was some degree of perceived stress. (Author)

AD-A074 167/8 PC **A02**/MF **A01**
Washington School of Psychiatry DC
Programmed Alteration of Perceptual and Conceptual Control Over Behavior: Two Papers,
israel Goldiamond. Feb 64, 17p
Contract DA-49-193-MD-2448

Two papers are presented. In the first, discrimination of differing triangles, perceptual stimuli, is established errorlessly in preschool children, where, without the sequence, such discrimination is extremely difficult. In the second paper, the sequence is used to establish conceptual control over behavior. The papers exemplify the 'fading' method, adapted from programmed instruction and derived from animal research. This involves programming the establishment of discrimination without error. The papers also indicate the behavioral similarity between discrimination, perception, and conceptualization. Uses of the procedure for research and training in these areas are suggested.

AD-A074 169/4 MF **A01**
Army Infantry Center and Fort Benning GA
Communist Mistreatment of U. S. Prisoners of War.
1954, 12p
Availability: Microfiche copies only.

The Communist treatment of prisoners of war is an insidiously planned conspiracy with a far reaching goal - World Domination. Prisoners of war are an important segment of this well-planned scheme. The treatment, indoctrination and utilization of prisoners of war are all part and parcel of Communist policy. The Communists refuse to concede a captured enemy any of his traditional rights as a prisoner. In their ideological struggle against 'capitalism and imperialism', they concede no rights to the individual. For them, captured enemy personnel are still part of the struggle. They consider their personnel who have been taken prisoner only to be temporarily out from under their control. Prisoners, too, must be used to serve Communist ends. The spirit of the Geneva Convention is a great moral achievement, but the Communists have violated all the humanitarian principles involved in regard to the treatment of prisoners of war. Their status and welfare were disregarded by the Communists from the time of capture to their repatriation and threats were made to secure their cooperation after repatriation.

AD-A074 195/9 PC **A14**/MF **A01**
Army Infantry Center and Fort Benning GA
Modern Volunteer Army Experiment - 1971.
Installation evaluation rept.
26 Jul 71, 306p

When the decision was made to establish Fort Benning as one of the Army's initial VOLAR experimental posts, guidance was given that evaluation of the effects of VOLAR actions should be given a high priority. Accordingly, acction was initiated at Fort Benning to develop an evaluation plan at the same time as planning was initiated for the VOLAR actions themselves. The principal evaluation tool was a questionnaire that assessed (a) career intentions and attitudes toward Fort Benning, (b) general attitudes toward the Army and military service, and (c) attitudes toward the specific VOLAR actions identified for implementation at Fort Benning. This questionnaire was given to a large sample of enlisted and officer personnel at Fort Benning both prior to implementation of VOLAR actions, and in June 1971, after the VOLAR program had been in operation for approximately six months. It was intended to assess the impact of VOLAR actions in terms of any change found on the questionnaire between the times of the two testings.

AD-A074 197/5 Not available NTIS
Army Electronics Command Fort Monmouth NJ
The Characteristics of the Cutaneous Communications Channel,
H. S. Bennett, and J. R. Hennessy. Jun 67, 22p

Perception of the electrocutaneous stimulus is slow. It may be associated with the sensation of diffuseness of the electrical stimulus. The electrical and the neurological nature of the problem can be understood in terms of the cutaneous impedance model (Bennett et al., 1966), which hypothesized three principal levels of resistance in the skin. ECOM experiments have demonstrated the electronic, ionic and electrode surface complexity of the cutaneous impedance. As an overall conclusion, it can be said that the investigation to date indicates that the sharpening of acuity of reception of electrocutaneous messages can be achieved by the use of 'shadow' signals delayed in time and displaced in location from the primary signal. The ventral-dorsal combination on the forearm offers particular promise. Similarly the use of an electrocutaneous signal as a secondary cueing channel in conjunction with a primary acoustic channel has been shown to result in an effective 3 db signal to noise enhancement of the acoustic channel when that channel is degraded to the level of -5 db.

AD-A074 208/0 PC **A02**/MF **A01**
Applied Psychological Services Inc Wayne PA Science Center
Experiments in Electrocutaneous Information Transfer,
Arthur I. Siegel, Douglas Macpherson, and Richard Lanterman. 1963, 19p
Contract DA-36-039-SC-87230

This paper presents the results of several separate studies, conductd by Applied Psychological Services under contract with the U.S. Army Electronics Research and Development Laboratories, Fort Monmouth, into the potential of electroncutaneous stimulation for presenting certain classes of military information for Signal Corps' equipment systems. These studies, along with others, were completed over a period of a year and represent initial, introductory, and exploratory work. Currently, the work is being extended to more sophisticated signal systems.

AD-A074 209/8 PC **A02**/MF **A01**
Louisville Univ KY Dept of Psychology
Perceptual Evaluation of Sensory Information.
Semi-annual progress rept. 1 Sep 62-1 Feb 63,
John R. Binford. Feb 63, 6p
Contract DA-49-193-MD-2197

No abstract available.

AD-A074 210/6 PC **A04**/MF **A01**
Louisville Univ KY Dept of Psychology
Communication by Electrical Stimulation of the Skin.
Final technical rept. 1 Nov 62-31 Oct 63,
Emerson Foulke. May 64, 70p
Grant DA-MD-49-193-62-G-49

For the past two years, a project has been underway to construct an electrocutaneous code, to teach this code to a group of subjects, and to evaluate its usefulness. A code was constructed in which stimuli were varied in three stimulus dimensions. There were ten loci, the ten fingertips, two stimulus durations, and two stimulus intensities. Each signal in the code was characterized by one of the ten loci, one of the two durations, and one of the two intensities. This arrangement resulted in the stimulus alphabet of 40 signals. Twenty-six of these signals were paired with the 26 letters of the alphabet. The remaining signals were paired with punctuations and with frequently recurring letter groups such as 'ing', 'er', and 'and'. Subjects have received training in the reception of this code for over a year. On the reception of unfamiliar prose, a few subjects have shown word rates as high as 20 words per minute. Three of these better subjects were each given fifteen random permutations of the code signals, and their performance was sum-

marized in a stimulus - response matrix. Work was also begun on another electro-cutaneous code in which signals were formed from patterns of simultaneously applied dc pulses. Although this work is still in the pilot stage, preliminary results suggest signals formed in this way may be much better than those formed by combining stimulus dimensions with respect to reaction time. Reaction times to signals in the locus pattern code appear to be two or three times as short as the reaction times to signals in the tri-dimensional code.

AD-A074 215/5 PC **A04**/MF **A01**
Michigan Univ Ann Arbor Inst for Social Research
The Processes of Visual Perception.
Final rept.,
William R. Uttal. Sep 79, 59p
Contract N00014-77-C-0471

This report summarizes the contents of a book entitled The Processes of Visual Perception written during the course of this contract. The book presents a classification system of visual processes that organizes and arranges the extensive data base of perceptual science. The taxonomy consists of 6 levels: Level 0, Preneural Transformations; Level 1, Receptor Transformations; Level 2, Neural Network Transformations; Level 3, Figural Organization Processes; Level 4, Multidimensional Interactions; and Level 5 Image Manipulation. (Level 5 is not discussed in this book. It will be the topic of the next book in the series of which this present one is the third volume.) This progress report presents a brief summary of each of the chapters in the book as well as the entire last chapter. This final epilog, entitled 'Emerging Principles of Visual Perception' was the target towards which this entire research project was aimed. At the outset of the book, it was asserted that the major contribution it could make would be the statement of current thinking in the field of perceptual science. This list of principles, as well as the taxonomy itself, is a synthetic and integrative metatheory of perceptual processing as our science sees it in the last third of the twentieth century. (Author)

AD-A074 315/3 PC **A05**/MF **A01**
Naval Postgraduate School Monterey CA
Psychological, Social and Attitudinal Variables Associated with Infantry Combat Effectiveness and their Relation to Women.
Master's thesis,
Phillip Karl Carreon. Jun 79, 96p

Currently, consideration is being given to opening up combat occupations to women. This thesis reviewed relevant literature in the fields of psychology and sociology, and found that several individual and group variables (body dimensions, personality, activity level, and social cohesion) were related to adequate combat performance. The results of the literature search suggest that women may not be as well suited to combat as are men. In addition, 55 graduate students were asked to rate 51 jobs as to suitability for women. The results of the questionnaire were analyzed using multidimensional scaling and cluster analysis. The analysis resulted in the identification of two criteria that appear to have been used by the subjects to rate the jobs: traditional masculine/feminine occupations, and the degree to which a job was or was not physically demanding. (Author)

ED-167 107 Not available NTIS
Utah State Univ., Logan.
'A Sense of One's Own Potential'--Proceedings of the Reading Maturity: Self-Awareness Workshop, June 6-10, 1977,
Brenda Branyan. Jun 77, 76p
Proceedings of the Reading Maturity: Self-Awareness Workshop held at Utah State University, Logan, UT on June 6-10, 1977.
Document Not Available from EDRS. Available from Center for Instructional Product Development, UMC 30, Utah State University, Logan, Utah 84322 ($4.50).

This workshop, sponsored by the Department of Instructional Media, Utah State University, gave special consideration to the relationship between the art and science of reading, and developing self-awareness. Dr. Jean E. Lowrie addressed her papers to reading maturity, reading guidance, and reading programs on an international level. Dr. Stan Patterson's presentations focused on working with students in a personalized program of reading guidance aimed at helping today's youth face the future, and Mrs. Patricia Powers presented an informative session on self-awareness, its definition and dimensions. Feelings, reactions, perceptions, and behavior were the primary areas of concern reflected in these papers. Self perception and individual conceptions of reading were simultaneously considered in light of the value attached to reading in one's personal life, in the lives of the students, and in relation to the contributions that human and literary efforts make to the lives of all involved. A selected bibliography is included.

HRP-0026719/5 Not Available NTIS
Rochester Univ., NY. School of Nursing.
Comparison of Manifest Needs of Nurses and Physicians in Primary Care Practice.
Judith A. Sullivan. 1978, 5p
Pub. in Nursing Research v27 n4 p255-259 Jun-Aug 78.

The Edwards Personal Preference Schedule (EPPS) was completed by graduate nurses enrolled in a medical nurse practitioner program and their physician colleagues to ascertain the personality needs of nurses and physicians engaged in primary care. Three questions were posed: (1) whether personality needs of order, deference, and endurance prevail within the nurse practitioner sample; (2) whether shifts occur in nurse practitioners' needs over the 4-year period from 1972-76; and (3) how the need profile of nurses compares with that of physicians. Of 129 graduate nurses, 127 participated; of 60 physicians, 31 responded. The EPPS was used primarily because of its ability to control social desirability by forced-choice items and its relative ease of administration. It contained 15 items for scoring. Among nurses, needs ranked highest were heterosexuality, dominance, intraception, change, and achievement; deference, order, and endurance ranked consistently lower. The most significant for physicians were dominance, achievement, heterosexuality, autonomy, and change. Only one need, intraception, differed significantly between nurses and physicians, with nurses scoring higher. Because both professions are committed to working together in primary care practice, the comparative evaluation of personality needs is useful in identifying compatibility. The findings suggest an emerging assertiveness on the part of nurses and a trend toward similar need patterns of nurses and physicians. Supporting data are tabulated.

N79-31932/3 PC **A04**/MF **A01**
Texas Univ. at Austin.
Making It in Academic Psychology: Demographic and Personality Correlates of Eminence.
R. L. Helmreich, J. T. Spence, W. E. Beane, G. W. Lucker, and K. A. Matthews. 1979, 56p
NASA-CR-162287
Grant NSG-2065, Contract NSF BNS-78-08911

Citations to published work, personality, and demographic characteristics were examined in a sample of male and female academic psychologists. A large sex difference was found in citations with men receiving significantly more recognition. Reputational rankings of graduate school and current institution were significantly related to citations, as were components of achievement motivation. Mastery and work needs were positively related to citations while competitiveness was negatively associated with the criterion. A model of attainment in psychology is proposed and possible explanations for the differential recognition of women are explored.

PB80-102585 PC **A05**/MF **A01**
Howard Univ., Washington, DC.
Factors Influencing Role-Innovative Career Striving in Black and White College Women: The Effect of Expectancies, Causal Attribution, Sex Role Self Concept and Achievement Related Motives.
Final rept.,
Martha T. Shuch Mednick. 31 Oct 79, 88p
DLETA-91-11-76-48-1
Contract DL-91-11-76-48

Motivational and cognitive factors related to the career aspirations of black and white college women were examined. The results indicate greater internality for success and externality for failure for the innovators as compared with the traditionals. The groups were also differentiated on the measures of achievement motivation and sex role self concept.

PB80-103799 Not available NTIS
National Bureau of Standards, Washington, DC.
Human Behavioral Considerations in the Planning and Design of Passive Solar Systems for Commercial Facilities: An Exploratory Study of the Effects of Sun and Shade.
Final rept.,
F. I. Stahl, D. Conway, and M. R. Goglia. Oct 79, 4p
Pub. in Proceedings of the National Passive Solar Conference (4th) Held at Kansas City, MO. on October 3-5, 1979, p26-29, Oct 79.

An exploratory study was conducted to determine whether alterations in sun and shade patterns (which may result from certain passive solar retrofit designs) influence window-shopping and other behaviors on retail streets. Pedestrians were observed at two urban locations. The hypothesis that in cool weather pedestrians prefer the sunny (rather than shady) side of retail streets was partially supported by the data. The hypothesis that durations of window-shopping and other relevant behaviors would be greater on the sunny side was not supported.

PB80-107147 PC **A04**/MF **A01**
Connecticut Univ., Storrs. Dept. of Sociology.
Casual Models of Stability and Change in Women's Work Relevant Attitudes and Employment Behavior.
Final rept.,
Myra Marx Ferree. Aug 79, 63p DLETA-21-09-78-49-1
Grant DL-21-09-78-49

The research investigates the extent of true change, apart from measurement error, in mature women's normative attitudes about employment and the relationship between such attitudes and the individual's own employment. Attitudes were found to change substantially in the period 1967-1972. Although attitudes in 1967 are related to prior employment, attitude change was not related to the extent of previous work experience or to work status at the start of the period (1967) but was related to the extent of employment in the intervening years. Attitudes themselves were also found to exert a considerable influence on the extent of subsequent employment. Even among mature women, therefore, both favorable attitudes and actual employment seem to have mutually reinforcing effects upon each other.

5K. Sociology

AD-A074 293/2 PC **A02**/MF **A01**
Race Relations Coordinating Group Fort Benning GA
Race Relations Program at Fort Benning.
Aug 71, 20p.p

No abstract available.

AD-A074 316/1 PC **A07**/MF **A01**
Naval Postgraduate School Monterey CA
The Circassians in Jordan.
Master's thesis,
Bruce Douglas Mackey. Jun 79, 132p

This thesis examines the political, economic and cultural position of the Circassian minority in Jordan. Although the Circassian minority constitutes only about 1% of the population it occupies a disproportionately influencial political and economic position. This thesis provides a brief historical background of the Circassians prior to their migration to Transjordan, outlines the means by which the Circassians reached their high status in Jordanian society, the methods by which they have maintained this position, and offers a projection as to the future of the Circassians in Jordan.

ED-167 112 Not available NTIS
New York State Coll. of Agriculture and Life Sciences, Ithaca.

Communicating with the Rural Poor.
Rept. no. 10,
Njoku E. Awa. Jan 76, 14p
For related documents, see IR-006 846-851 and ED-162 648.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$1.67, MF$0.83 Plus Postage. Also available from The Communication Arts Graduate Teaching and Research Center, Cornell Univ., 640 Stewart Avenue, Ithaca, NY. 14853 (single copies are free).

A study was conducted to examine possible problems in the information dissemination of social aid programs for the poor. Two samples of 141 community leaders and 143 low-income families were selected from a New York county with a high percentage of households in relative poverty and a low percentage in relative affluence. Data gathered from the two samples by personal interview using structured questionnaires included information on demographic and socioeconomic characteristics, beliefs and attitudes, and communication behavior. Community leaders were found to be considerably more exposed to newspapers, magazines, and books than were the rural poor. Two obstacles to leader-client communication (through the printed word) were identified--money and motivation. Lack of funds prevented the poor from subscribing to newspapers and magazines, while lack of motivation accounted for their low interest in the content of farm bulletins. It is suggested that these disincentives might be dislodged or offset by the use of cost-free media that have motivational appeal.

HRP-0028754/0 Not Available NTIS
Baylor Coll. of Medicine, Houston, TX. Dept. of Psychiatry.
Life Circumstancces and Physical Illness -- A Cross Disciplinary Survey of Research Content and Method for the Decade 1965-1975.
Diana Hull. 1977, 25p
Pub. in Jnl. of Psychosomatic Research v21 p115-139 1977.

This article summarizes a 10-factor, 95-category scheme for analyzing the content and method of 329 research articles dealing with social, psychological, and life event antecedents of physical illness. The 10 factors used to examine research covering the 1965-75 period were predisposing social conditions, precipitating factors, illness, method of sampling (two factors), discipline of senior author, journal, year of publication, precision (dependent variable), and precision (independent variable). The output of research articles from 19 journals dealing with antecedents of physical illness remained at a consistent level over the years, with a standard deviation of 4.88 articles. Five journals contained 80.5 percent of all relevant research. In the total number of 329 research articles, 8 illness groups accounted for 76.7 percent of the outcome factors investigated. Social factors accounting for illness, in rank order, were age, emotional traits, gender, occupation, place, social class, marital status, lifestyle, education, race, ethnic-religious background, family structure, rural-urban status, poverty, and social factors in general. Precipitating events involved in illness, in rank order, included emotional state, life events in general, migration, object loss, social mobility, and social disorganization. The illnesses most frequently studied in the five journals are discussed, as are the sampling methodology and the reliability of the research findings. Supporting data are provided.

HRP-0029028/8 Not Available NTIS
Victoria Univ. of Manchester (England). Dept. of Community Medicine.
Designing a Comprehensive Service for a Health Care Group -- A Framework for Planning.
F. Eskin, D. Hewett, A. Hindle, J. T. Wilson, and K. Wright. 1978, 4p
Pub. in Medical Education v12 n6 p431-434 Nov 78.

A multidisciplinary team developed an exercise based on a general framework for planning to examine the essential nature of planning services for a health care group. The exercise focuses on particular skills considered essential for effective planning. The subject of this discussion is the first program, which was concerned with psychogeriatric services. The exercise can, however, be adapted to other services. The exercise offers the participants (drawn in the past from medicine, clinical medicine, nursing, and social services) a chance to use a real problem to explore the problems associated with the planning of a service and to become aware of the value of multidisciplinary teamwork and of the contributions made by other professionals. The importance of the clinician is stressed. Clinical input is an important aspect of the exercise. It is concluded that because the planning system of Britain's National Health Service can only function effectively when a corporate approach is involved, an educational experience that crosses professional boundaries must be offered.

HRP-0029479/3 Not Available NTIS
Johns Hopkins Univ., Baltimore, MD. School of Hygiene and Public Health.
Genetic Issues in Public Health and Medicine.
Bernice H. Cohen, Abraham M. Lilienfeld, P. C. Huang, and Bentley Glass. 1978, 486p
Available from Charles C. Thomas, Pub., 301-327 East Lawrence Ave., Springfield, IL 62703.

An overview is presented of the significant genetic issues in public health. The ethical, moral, social, and legal aspects of the issues are discussed. The risks of administering the RH immunoglobulin during pregnancy are considered and the hazards of recombinant DNA are outlined. The basic principles of genetic interaction are examined and some examples of ecogenetics are provided. Reasons for diagnostic screening for birth defects are supplied. Neonatal screening can provide information which would otherwise be unavailable. This information may then be used for incidence statistics, genetic interpretation, and health services planning. A discussion of the genetic disorders that aggregate in special population segments is presented and reasons are offered as to why the disorders should be studied. The role of genetic counseling in preventive medicine is delineated. Analyses are provided of various aspects of genetic engineering. The benefits of genetic intervention are discussed and the implications of genetic intervention for man and society are noted. A bibliography is supplied. Tables and figures illustrate the data.

LBL-9099 PC **A17**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Elderly Housing Characteristics: Planning and Service Areas, State of California. 1970 Census of Housing.
B. R. Burkhart. Apr 79, 383p
Contract W-7405-ENG-48

Elderly Housing Characteristics for Planning and Service Areas in California contains a collection of statistics selected and organized to describe occupied residential housing conditions of older population who live independently in the state. Seventeen major housing characteristics are tabulated: number of rooms and persons, plumbing facilities, year structure built and head moved into unit, unit income and value, number of bedrooms and automobiles, monthly gross rent, second home ownership, units in structure by owner and renter, value/income ratio, gross rent as percentage of income, unit value by income, income and gross rent as percentage of income. In all tables for this report, the state and PSA totals are disaggregated to show household type, tenure, sex, and racial characteristics. PSA's consist of single counties or groups of counties designated by the California State Office on Aging. (ERA citation 04:044979)

PB80-100357 PC **A07**/MF **A01**
Department of Agriculture Extension Service, Washington, DC.
Travaux Menagers en Milileu Rural (Homemaking Around the World).
Nov 73, 148p
Text in French. See also English version, PB-292 767. Sponsored in part by Agency for International Development, Washington, DC.

In this translation of the English publication titled 'Home Making Around the World', the following topics are covered: Baby care and needs. Everything from psychological needs, love, safety, discipline etc., to physical needs, diet rest, playtime, clothing; Food and diet. Plans to train assistants for teaching mothers, food values, available vegetables, and their cooking, canning, drying, and juice-making; How to run the home. Different ways of heating foods are considered, different kinds of ovens are shown, cooking utensils, washing instructions and pest control are elaborated; Hygiene, of home, and personal. All aspects of sanitation in the home are covered, as well as cleanliness of hair and body; Vegetable gardens. How to choose the proper area for growing vegetables and kinds to grow. Importance of fertilizers is treated and pest control; How to raise poultry, rabbits and goats, what to feed them and how to keep them healthy. How to improve the rural home. This section covers native habits, how to whitewash walls, beds and bedding; and How to sew and take care of clothing, including the preparation of patterns and mending.

PB80-100365 PC **A04**/MF **A01**
Agency for International Development, Washington, DC.
Batir Soi-Meme - Formation des Animateurs de l'Operation 'Castor' (Leader Training for Aided Self-Help Housing),
Keith H. Hinchcliff. May 63, 71p
Text in French. See also English version, PB-179 362.

This translation of an English publication titled 'Leader Training for Self-Help Housing' covers the following points: Types of assistance required--technical, financial, material and specialists; Advantages and drawbacks of a self-help program--reduced lay-out, satisfaction, creation of small businesses, time and quality considerations; Examples of programs of self-help without outside assistance. Need for visual aids and technical advicve when no actual assistance is given; How to plan a program for a collective construction project. Layout, security and comfort are considered; Various construction materials are discussed; An evaluation of resources, personnel, financing, equipment and necessary assistance. Charts are included; A discussion on how to educate and to animate the people. Discusses visual-aids; and Methods to be used to assure favorable results, when launching a local construction program, and assistance is given.

PB80-101330 PC **A11**/MF **A01**
General Accounting Office, Washington, DC. General Government Div.
Gains Made in Controlling Illegal Drugs, Yet the Drug Trade Flourishes.
Report to the Congress.
25 Oct 79, 232p GGD-80-4

The report assesses the Federal Government's drug enforcement and supply control efforts during the last 10 years, including information contained in a series of GAO reports issued on drug control and various related topics during this time. Federal agencies have fought hard to reduce the adverse impact of illegal drugs on American society. While current indicators suggest some positive results in reducing drug-related deaths and injuries and decreasing heroin supplies, the drug trade continues to flourish, and the problem persists for reasons tied to the enormous supply of and demand for drugs. Effective law enforcement, crop eradication, and other controls will cause shifts and temporary disruptions in trafficking and use patterns, and buy time to enable the Nation to concentrate on long term solutions. But if the United States is to make greater inroads, it must take a much tougher and consistent stance. The executive and legislative branches must form a partnership to agree upon and vigorously carry out a consistent national policy on drug abuse.

PB80-101462 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Housing Leased to Lower Income Persons: Better Federal Guidance and Management Could Improve Quality.
Report to the Congress.
30 Oct 79, 96p CED-80-7

This report presents GAO's assessment of housing quality in the Department of Housing and Urban Development's section 8 existing housing program. A number of recommendations are included to promote better guidance and manage-

ment over section 8 housing quality. GAO's review was made because little information has been available on whether program participants are leasing decent, safe, and sanitary housing--a major program objective.

PB80-101587 PC **A16**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Urban Studies and Planning.
Child Support Enforcement and Welfare Dependency.
Final rept. Sep 78-Feb 79,
Janet M. Loneragan. May 79, 366p DLETA-91-25-78-49-1
Grant DL-91-25-78-49

The research examines the impact of child support enforcement on the welfare dependency of female-headed families in the low-income, high unemployment region of New Bedford, Massachusetts. Very few absent fathers were able to pay support in excess of their families AFDC grant level, thereby forcing their ineligibility for continued assistance. Support levels are also dependent upon paternal willingness-to-pay.

PB80-102106 PC **A04**/MF **A01**
Washington State Dept. of Licensing, Olympia.
Special Adjudication for Enforcement (SAFE)-Seattle.
Final rept. Jul 77-Apr 78,
Philip M. Salzburg, and Carl L. Klingberg. Apr 78, 66p DOT-HS-804 782
Contract DOT-HS-343-3-682
See also report dated Dec 76, PB-277 645.

The Special Adjudication For Enforcement (SAFE) project was designed to examine the effectiveness of a special adjudication/referral/rehabilitation system for dealing with traffic offenders. Although the system has much in common with the administrative adjudication approach in that it eliminates a formal courtroom appearance, it also is unique in that a para-judicial (magisterial) system is employed. Specifically, traffic citations are adjudicated by a magistrate in an informal hearing in which defendents can conveniently and quickly present their cases including any extenuating circumstances. Magistrates are authorized to accept guilty pleas, dismiss the charges, or, where there are questions of evidential fact or where a defendant wishes to contest a case further, to refer cases for formal court hearing. Additional features of the Seattle SAFE system include magistrate referral to a Driver Improvement Analyst (DIA) for diagnosis and/or counselling or direct referral to one of several driver improvement programs.

PB80-102841 PC **A16**/MF **A01**
Urban Inst., Washington, DC.
Implementing Welfare-Employment Programs: An Institutional Analysis of the Work Incentive (WIN) Program,
John J. Mitchell, Mark Lincoln Chadwin, and Demetra Smith Nightingale. Oct 79, 352p
Grant DL-51-11-77-01

The report examines factors that influence the effectiveness of state and local units of the Work Incentive (WIN) program and suggests ways of improving the performance of this welfare-employment program. The report focuses on the organizational, managerial and service delivery characteristics that our research indicated were conducive to high performance. It also discusses the environmental factors, such as demographic and labor market conditions, which affect WIN performance at the state and local level. This report is based on data collected and analyzed over a two-year period. Extensive field research was conducted in 43 local sites and ten states as well as regional and Washington offices in both the Department of Labor (DOL) and the Department of Health, Education, and Welfare (HEW). The approach was to study what differentiated high performing programs from low performers and to use that knowledge as the basis for recommendations.

PB80-103419 PC **A06**/MF **A01**
Alaska Dept. of Health and Social Services, Juneau.
Aid to Families with Dependent Children. 1977 Recipient Characteristics Study (Alaska).
Jul 78, 116p DHSS-1/79

In March 1977, the Office of planning and Research, Research and Statistics Section in conjunction with the Division of Public Assistance conducted a research study of AFDC recipients in Alaska. The study covered March 1977. Unless it was otherwise specified, the questions on the schedules were answered to reflect the status of the case during the study month. The completed study schedules were packaged and sent to the National Center for Social Statistics. The National Center processed the data on the schedules and tabulated the statistical information. Upon completion of the data processing and statistical tabulation phases, the National Center for Social Statistics provided each state with their individual statistical tabulations for each item on the study schedule. It is from this information that this publication is compiled.

PB80-105430 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Rental Housing: A National Problem That Needs Immediate Attention.
Report to the Congress.
8 Nov 79, 41p CED-80-11

Millions of Americans cannot afford home-ownership and cannot find affordable rental housing. Immediate national attention is necessary if an adequate supply of affordable rental housing is to be available. The Department of Housing and Urban Development is the principal Federal agency responsible for providing assistance for rental housing. The Congress and the Administration should take steps to mitigate this nationwide crisis.

PB80-105646 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Serving a Broader Economic Range of Families in Public Housing Could Reduce Operating Subsidies.
Report to the Congress.
7 Nov 79, 55p CED-80-2

The financial condition of some agencies providing housing assistance to low-income families continues to deteriorate despite Federal legislation enacted 5 years ago to counteract this trend. Providing housing for a broader economic range of families could improve the situation. Unless action is taken, continued financial deterioration and increased dependence on Federal subsidies may result. No simple solution exists to motivate housing agencies to house a broader range of low-income families instead of the poorest households. Housing poor families in preference to very poor families involves hard choices. Formidable problems of a moral and administrative nature exist. The Department of Housing and Urban Development should make a firmer commitment to implement the legislation by guiding and monitoring housing agencies more effectively.

PB80-107857 PC **A03**/MF **A01**
State Univ. of New York at Albany. School of Criminal Justice.
Studies in Criminal Justice, 1976.
Final rept.,
R. A. Myren. Jun 76, 26p NSF/RA-761664
Grant NSF-GI-29727

The project on criminal justice is divided into three major areas of emphasis, and lists specific accomplishments in each of them. The first is the improvement of the relationship in upstate New York between the operating juvenile justice system and the youth with which it comes in contact. The second is the establishment of a criminal justice baseline statistics laboratory for New York. The third area is the increased utilization of the research potential of the faculty at the State University of New York (Albany School of Criminal Justice) and the advanced graduate students through a series of small projects. A detailed narrative report of the history of the project is presented, followed by general observations and recommendations. A list of students who received stipends for research assistance under the grant and a list of reports that supplement or illustrate the narrative administrative reports are provided.

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

CONF-790485-1 PC **A03**/MF **A01**
Argonne National Lab., IL.
Exp 13 C Cross-Polarization Magic-Angle NMR Studies of Biological Systems.
S. S. Danyluk, and H. M. Schwartz. 1979, 26p
Contract W-31-109-ENG-38
Stereodynamics of molecular systems symposium, Albany, NY, USA, 23 Apr 1979.

The following topics are discussed: use of high-resolution NMR spectroscopy for studies on naturally occurring biological molecules; cross-polarization magic-angle techniques; transfer of magnetic polarization from an abundant magnetic nucleus, exp 1 H, to a less abundant nucleus, exp 13 C, via the thermal reservoir; high-resolution exp 13 C spectra for membrane constituents of bacterial cells; high-resolution exp 13 C spectra for canine tendon, bovine tendon, and mouse tail, lipid mobilities in various tissue states; comparison of mobility of collagen in canine tendon with that of bovine tendon and rat skin; and measurement of exp 13 C natural abundance spectra for several polycrystalline and amorphous biomolecular materials. (ERA citation 04:050605)

N79-31895/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Obtaining Growth Hormone from Calf Blood.
L. A. Kalchev, K. K. Ralchev, and I. T. Nikolov.
Aug 79, 9p NASA-TM-75326
Contract NASW-3199
Tran-Transl. Into English from Godishnik Sofiiskiya Univ. Biol. Fak. (Sofia), Vol. 62, Bk. 1, 1967-1968 p 175-181. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By Dept. Of Animal Physiol.

The preparation of a growth hormone from human serum was used for the isolation of the hormone from calf serum. The preparation was biologically active - it increased the quantity of the free fatty acids released in rat plasma by 36.4 percent. Electrophoresis in Veronal buffer, ph 8.6, showed the presence of a single fraction having mobility intermediate between that of alpha and beta globulins. Gel filtration through Sephadex G 100 showed an elutriation curve identical to that obtained by the growth hormone prepared from pituitary glands.

6B. Bioengineering

PAT-APPL-6-057 526 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Spine Immobilization Method and Apparatus.
Patent Application,
K. H. Lambson, and H. C. Vykukal. Filed 13 Jul 79, 16p N79-30921/7, NASA-CASE-ARC-11167-1
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A spine immobilization apparatus which uses a normally flat, flexible bladder filled with beads or microballoons is described. The beads form a rigid mass when the pressure within the bladder is decreased below ambient through the use of a suction pump. The bladder can be conformed to the victim's torso to provide the desired restraint. It is strapped to the victim prior to being rigidified by an arrangement of straps which avoid the stomach area. The bladder is adapted to be secured to a rigid support, i.e., a rescue chair, so as to enable removal of a victim after the bladder has been made rigid. A double sealing connector is used to connect the bladder to the suction pump and a control valve is employed to vary the pressure within the bladder so as to soften and harden the bladder as desired.

6C. Biology

AD-A074 029/0 PC **A02**/MF **A01**
Georgetown Univ Washington DC Immunologic Oncology Div

Specificity of Primed LD Typing: The Major Reactions.
Medical research progress rept. no. 2,
R. J. Hartzman, D. B. Amos, F. Pappas, A. H. Johnson, and F. Ward. 1979, 9p NMRI-79-28
Contract N00014-77-C-0747
Pub. in Transplantation Proceedings, v11 n1 p690-695 Mar 79. Prepared in cooperation with George Washington Univ., Washington, DC on Contract N00014-76-C-1173, Duke Medical Center and the Transplant Lab., VA Hospital, Durham, NC.

No abstract available.

AD-A074 031/6 PC **A02**/MF **A01**
Georgetown Univ Washington DC School of Medicine
MLC and CMC Reactivity and Specificity of Idiotype-Specific Lymphoid Cells Enriched for Histocompatibility (H-2) Antigens.
Medical research progress rept.,
T. M. Folks, A. Ahmed, J. J. Ryan, M. Feldmann, and J. Woody. 1979, 10p NMRI-79-30
Contract N00014-77-C-0748
Pub. in Transplantation Proceedings, v11 n1 p683-689 Mar 79.

No abstract available.

AD-A074 204/9 PC **A05**/MF **A01**
Science and Education Administration Fort Lauderdale FL Aquatic Plant Management Lab
Evaluation of Chemicals for Aquatic Plant Control.
Annual rept. for FY 1978,
Kerry K. Steward. Aug 79, 84p WES-MP-A-79-3

The purpose of this project was to expand evaluation research on the use of chemicals for aquatic weed management in an attempt to discover new herbicides or growth regulators. Several experimental formulations of fenac were screened for efficacy against waterhyacinth, hydrilla, and southern naiad. All ten were efective against waterhyacinth, four were effective against hydrilla, and three were effective against southern naiad. The growth retardant EL-509 effectively inhibited hydrilla regrowth from clipped stems for 24 weeks in outside aquaria. Combinations of fenac and organic copper complex more effectively controlled hydrilla in outside aquaria than either herbicide when used alone. Hexazinone had controlled hydrilla in outside aquaria for nearly a year when the experiment was dismantled. No growth occurred from rootstocks nor from propagules since production of propagules had been prevented by treatments. Phytotoxic residues were detected by bioassays 8 months after treatments. Field evaluation of hexazinone under Du Pont's experimental use permit produced control of hydrilla for over 12 months at 3.4-kg/ha treatment rate but for only 4 months at the 6.7-kg/ha rate.

AD-A074 326/0 Not available NTIS
California Inst of Tech Pasadena Dept of Applied Mathematics
Stable Oscillations in Single Species Growth Models with Hereditary Effects,
Donald S. Cohen, Evangelos Coutsias, and John C. Neu. 31 May 78, 13p ARO-15622.2-M
Contracts DAAG29-78-C-0011, NSF-GP-32157
Availability: Pub. in Mathematical Biosciences, v44 p255-268 1979 (No copies furnished by DDC).

No abstract available.

AD-A074 350/0 Not available NTIS
California Inst of Tech Pasadena Dept of Applied Mathematics
Multi-Species Interactions with Hereditary Effects and Spatial Diffusion,
Donald S. Cohen, and S. Rosenblat. 5 Jun 78, 11p ARO-12615.15-M
Contracts DAAG29-75-C-0009, NSF-GP-32157X2
Availability: Pub. in Jnl. Mathematical Biology, v7 p231-241 1979 (No copies furnished by DDC).

No abstract available.

AD-A074 376/5 PC **A02**/MF **A01**
Case Western Reserve Univ Cleveland OH Dept of Mathematics and Statistics
Empirical Bayes Estimation of Critical Dosages Having Smallest Predictive Risk.
Technical rept.,
Ora Bialik, and S. Zacks. 15 Aug 79, 20p Rept no. TR-38
Contract N00014-75-C-0529
Prepared in cooperation with Pennsylvania Univ., Philadelphia. Dept. of Research Medicine.

An empirical Bayes procedure is developed for the estimation of critical dosages in the linear regression case. If Y = alpha + beta x + e is the basic linear model, the critical dosage is defined as xi (eta) = (eta - alpha)/beta, for beta > 0. A new type of Bayes estimator of xi(eta) is derived under the criterion of minimizing the predictive risk E < (alpha + beta xi - eta)-squared bar F sub n >. The empirical Bayes procedure provides consistant estimators of the prior parameters when a large number of independent repetitions of the experiment is available. The methodology is developed to analyze a large set of photodynamic bioassays, for the determination of critical air concentrations of benzo-soluble organic extracts. (Author)

PB80-101280 PC **A09**/MF **A01**
Michigan Univ., Pellston. Biological Station.
A Guide to Rotifers of the Laurentian Great Lakes.
Final rept.,
Richard S. Stemberger. Jul 79, 200p EPA/600/4-79/021
Grant EPA-R-804652

This guide to Laurentian Great Lakes rotifers treats 38 genera, which include 167 taxa. Major emphasis is given to planktonic and near-shore members of the Class Monogononta. The guide briefly covers materials and methods used in collecting, preparing and counting rotifer samples, as well as techniques used in examining rotifer trophi and preparing permanent rotifer mounts. Major anatomical identification characteristics of rotifers are also discussed. In addition to a key to genera, keys are given for major species, along with ecological and taxonomic notes.

PB80-105471 PC **A07**/MF **A01**
New Alchemy Inst., Woods Hole, MA.
Assessment of a Semi-Closed, Renewable Resource-Based Aquaculture System.
Progress rept. no. 3,
John H. Todd, Ron D. Zweig, Albert M. Doolittle, Jr., Robert Angevine, and David Engstrom. 20 May 79, 135p NSF/RA-790150
Grant NSF-OPA77-16790
See also report dated 23 May 78, PB-287 286.

Results of four long-term productivity experiments examining the subtleties of aquatic ponds are reported. These experiments consist of testing surface area and aeration, nitrogen input types and rates, fish monoculture under different aeration rates, and comparative growth evaluation. Five basic points are made: fish feeding rates and types affect fish growth; the ecosystem absorbs nutrients potentially toxic to fish; feeding rates affect water quality; water quality affects fish growth; and solar-algae ponds conserve energy. Improvements in the computer system are traced and their implications discussed. Following a description of the computer models developed to synthesize and draw meaning from the data, a comprehensive model of fish growth and water quality is outlined and future experiments described.

PB80-106461 PC **A11**/MF **A01**
Alaska Univ., Fairbanks. Sea Grant Program.
Readings from Alaska Seas and Coasts. A Newsletter for the Alaska Commercial Fishing Industry,
John L. Ball, Jr., T. Frady, and R. S. Lee. Aug 79, 244p SG-79/5, NOAA-79092002
Grant NOAA-04-8-M01-187

The collection has articles on practical matters facing the fisherman, but it also has discussions on state and federal fishing policies that affect fishermen in Alaska. Articles by experts on both sides of the issue helped Alaska fishermen understand the implications of the 200 mile limit, limited entry and the aquaculture program. These articles now provide students with a historical perspective on how these policies were put in place.

PB80-106677 PC **A03**/MF **A01**
Washington State Dept. of Fisheries, Olympia.
Development of Techniques for a Sea Urchin Fishery.
Completion rept. Jul 76-Sep 78,
Chris Jones. Apr 79, 34p NOAA-79092101

The red sea urchin (Strongylocentrotus franciscanus) fishery in Washington State grew to 1.6 million lb. in 1976 compared to previous annual harvests that had never exceeded 100,000 lb. This sudden increase resulted in an expanded effort by the Department of Fisheries directed at obtaining better knowledge of the sea urchin resource and development of an appropriate management plan. Methods to survey urchin stocks by SCUBA divers were developed by which the state's total resource of red urchins was estimated to be about 25 million lbs. However, because of low density or inaccessibility of some populations, less than half of these would be available to harvesters. Among other matters, these regulations provide for area rotation to prevent overfishing, seasonal restrictions to prevent harvest of spawning or spawned-out urchins, a minimum size limit to prevent harvest of small urchins, and a maximum size limit to protect the very large urchins that are essential for recruitment.

PB80-107626 PC **A03**/MF **A01**
New York Sea Grant Inst., Albany.
Long Island Surf Fishermen: 1975,
E. Glenn Carls, and Regina F. Bresnan. 1979, 47p NYSG/RS-79/21, NOAA-79091304
Prepared in cooperation with Waterloo Univ. (Ontario).

The objectives of this study were to: (1) Develop a demographic profile of Long Island surf fishermen; (2) evaluate the attitudes and opinions of surf fishermen toward selected planning and management issues, and (3) examine certain psycho-social and environmental factors that contribute to the surf fishing experience. Data were collected through a survey of surf anglers during the summer and fall of 1975.

6E. Clinical Medicine

AD-A073 880/7 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington DC
'Hammondia pardalis' sp. n. (Sarcocystidae) from the Ocelot, 'Felis pardalis,' and Experimental Infection of Other Felines,
Larry D. Hendricks, John V. Ernst, Charles H. Courtney, and Clarence A. Speer. 1979, 7p
Pub. in Jnl. of Protozoology, v26 n1 p39-43 1979.

No abstract available.

AD-A073 890/6 PC **A06**/MF **A01**
Academy of Health Sciences (Army) Fort Sam Houston TX Health Care Studies Div
Effect of the Army Oral Health Maintenance Program (AOHMP) on the Dental Health Status of Army Personnel. AOHMP Evaluation Study. Part I. The Role of the Required Annual Dental Examination as the Key to the Delivery of Needed Care.
Rept. no. 1 (Final) 3 Jan 78-3 Jun 79,
Richard V. Mayotte, Warren A. Parker, and George P. Barnes. Jun 79, 122p Rept no. HCSD-79-004-A
See also Part 2, AD-A073 891.

The Army Oral Health Maintenance Program is an official Department of the Army program which is designed to determine the oral and dental health care needs of Army personnel and to provide dentally-fit soldiers. The purpose of this phase of the study was to evaluate the program as a principal patient input source. Personnel were evaluated at ten Army installations using the annual dental examination requirements as the vehicle for bringing personnel to the dental clinic. Examinations were done for a period of one full month on all persons presenting for their annual exam. Four months later the dental records of those persons examined were reviewed to determine how much of the needed care was received. Treatment plans were formulated for each patient examined. Dental care needed was broken down into nine categories and sample distributions were determined for both care needed and care received. Patients were evaluated according to three specific characteristics:

rank, type of duty performed (combat or combat support/service support), and by post to which assigned. Since those persons who were judged to need no care were not considered in this part of the study, 100 percent of the sample required some kind of dental care, either corrective or preventive.

AD-A073 891/4 PC **A04/MF A01**
Academy of Health Sciences (Army) Fort Sam Houston TX Health Care Studies Div
Effect of the Army Oral Health Maintenance Program (AOHMP) on the Dental Health Status of Army Personnel. AOHMP Evaluation. Part II. Dental Health Record Review of Program Participation and Recurrent Care Needs.
Rept. no. 2 (Final) 3 Jan 78-3 Jun 79,
Warren A. Parker, and Richard V. Mayotte. Jun 79, 65p Rept no. HCSD-79-004-B
See also Part 1, AD-A073 890.

The Army Oral Health Maintenance Program is a Department Of Army approved dental program which serves as the primary patient input device for the Army dental care system. This is one phase of an evaluation study to determine how effectively the program is working. It was designed to evaluate the patient participation beyond the mandatory examination phase of the program as well as to determine the care completion rate and recurrent care needs ratio by means of dental records audit. The findings indicate that approximately 50 percent of the sample received an annual examination as a direct result of the AOHMP. The need for dental care among the sample was over 90 percent with dental prophylaxis, scaling, and restorations being recorded as the most frequently delivered services. Although few eligibles participated in the AOHMP routinely on an annual basis, those participants who went beyond the examination phase and received some needed care completed their care sequences 60 percent of the time. Recurrent care needs for restorative dentistry involved 50 percent of the sample. It was recommended that the program be continued and that long term non-participants be identified and introduced into the program. (Author)

AD-A073 916/9 PC **A02/MF A01**
Naval Health Research Center San Diego CA
Brief Group Therapy in Myocardial Infarction Rehabilitation: Three- to Four-Year Follow-Up of a Controlled Trial,
Richard H. Rahe, Harold W. Ward, and Vicki Hayes. 11 Jan 79, 15p Rept no. NAVHLTHRSCHC-78-53
Pub. in Psychosomatic Medicine, v41 n3 p229-242 May 79. Presented at the American Psychosomatic Society Meeting, 31 Mar 78, Washington, DC.

No abstract available.

AD-A073 977/1 PC **A02/MF A01**
Naval Dental Research Inst Great Lakes IL
The Health of Naval Recruits: Periodontal Diseases,
M. R. Wirthlin, E. B. Hancock, J. C. Cecil, and E. J. Mandel. Jul 79, 24p Rept no. NDRI-PR-79-04

Past surveys of naval recruits and enlisted men have found a deplorable state of oral and dental health, with a larger number of persons having advanced periodontal disease than had been previously recognized. Also, the disease starts at a much younger age than was generally believed. This report of a three-year survey found the prevalence of chronic inflammatory periodontal disease to be 100 percent. It is associated with poor oral hygiene, especially noted was the lack of interdental cleansing by the subjects. Only six teeth were examined in the screening method used, and four out of five subjects had pockets needing treatment by a Dental Officer. Thus, this report may underestimate the true prevalence and severity. Preventive dentistry measures of early detection, benchmark recording of conditions found in the recruits' health reocrds, informing the recruits of their condition, and early treatment are recommended. The Navy Periodontal Disease Index is a valid and reliable index in this population and has treatment needs significance. Because of the overwhelming treatment needs, research studies into therapy and prevention are needed in order to achieve readiness of naval personnel for the defense mission of the Navy.

AD-A074 028/2 PC **A02/MF A01**
Naval Medical Research Inst Bethesda MD
Computer Model for Simulation of Emergency Medical Systems.
Medical research progress rept.,
J. R. Fletcher, C. Delfosse, J. C. Bond, and P. B. Richards. Apr 79, 8p Rept no. NMRI-79-27
Pub. in Military Medicine, v144 n4 p231-235 Apr 79.

No abstract available.

AD-A074 030/8 PC **A02/MF A01**
Georgetown Univ Washington DC Lombardi Cancer Center
Murine T-Cell Heterogeneity.
Medical research progress rept.,
A. Ahmed, A. H. Smith, and T. Folks. 1979, 9p NMRI-79-29
Contract N00014-77-C-0748
Pub. in Cancer Treatment Reports, v63 n4 p613-618 Apr 79.

No abstract available.

AD-A074 032/4 PC **A02/MF A01**
Naval Medical Research Inst Bethesda MD
Veno-Arterial Cardioplumonary Bypass Without Heparin the Baboon.
Medical research progress rept.,
J. R. Fletcher, A. E. McKee, L. P. Watson, and R. D. Anderson. 1979, 14p Rept no. NMRI-79-31
Pub. in ASAIO Jnl, v2 n1 p17-27 Mar/Apr 79.

No abstract available.

AD-A074 076/1 PC **A04/MF A01**
Stanford Univ CA Dept of Computer Science
Knowledge Engineering for Medical Decision Making: A Review of Computer-Based Clinical Decision Aids.
Technical rept.,
Edward H. Shortliffe, Bruce G. Buchanan, and Edward A. Feigenbaum. Feb 79, 53p Rept no. STAN-CS-79-723
Contract MDA903-77-C-0322

Computer-based models of medical decision making account for a large proportion of clinical computing efforts. This article reviews representative examples from each of several major medical computing paradigms. These include (1) clinical algorithms, (2) clinical databanks that include analytic functions, (3) mathematical models of physical processes, (4) pattern recognition, (5) Bayesian statistics, (6) decision analysis, and (7) symbolic reasoning or artificial intelligence. Because the techniques used in the various systems cannot be examined exhaustively, the case studies in each category are used as a basis for studying general strengths and limitations. It is noted that no one method is best for all applications. However, emphasis is given to the limitations of early work that have made artificial intelligence techniques and knowledge engineering research particularly attractive. We stress that considerable basic research in medical computing remains to be done and that powerful new approaches may lie in the melding of two or more established techniques. (Author)

AD-A074 088/6 PC **A08/MF A01**
Navy Disease Vector Ecology and Control Center Jacksonville FL
The Epidemiology of Human Pediculosis in Ethiopia.
Special publication,
L. Lance Sholdt, Marvin L. Holloway, and W. Don Fronk. Jun 79, 159p

No abstract available.

AD-A074 147/0 PC **A02/MF A01**
Army Inst of Dental Research Washington DC
Scanning Electron Microscopy of Teeth in Autosomal Dominant Osteogenesis Imperfecta: Support for Genetic Heterogeneity.
Rept. for 1 Jul 78-1 Aug 79,
John M. Brady, L. Stefan Levin, and Michael Melnick. 10 Aug 79, 23p

SEM studies were performed on 25 deciduous and permanent teeth from members of seven kindreds with autosomal dominant osteogenesis imperfecta (O.I.). Two families had normal teeth on clinical and radiological examination; five families had blue or brown opalescent teeth with specific radiologic findings. Enamel surfaces and prism organization were normal on all teeth. On fractured surfaces, the dentin tubules of normal teeth from patients with O.I. were evenly distributed and coursed regularly to the dentin-enamel junction. Opalescent teeth had few tubules; those tubules present were narrow, short, and tortuous. Dentin calcification fronts of normal teeth were composed of many mushroom shaped nodules, with regularly spaced openings on their surfaces. Calcification fronts of opalescent teeth were composed of irregularly spaced, small nodules, which varied greatly in size one from another; the nodules lacked tubule openings on their surfaces. The results of this study support the concept that two autosomal dominant O.I. syndromes exist, one in which all individuals with O.I. have normal teeth, and the other in which all with O.I. have blue or brown opalescent teeth. (Author)

AD-A074 241/1 PC **A99/MF A01**
Walter Reed Army Inst of Research Washington DC
Research in Biological and Medical Sciences Including Biochemistry, Communicable Disease and Immunology, Internal Medicine, Physiology, Psychiatry, Surgery, and Veterninary Medicine. Volume I.
Annual progress rept. 1 Oct 77-30 Sep 78. 1978, 743p
See also Volume 2, AD-A074 242.

No abstract available.

AD-A074 242/9 PC **A99/MF A01**
Walter Reed Army Inst of Research Washington DC
Research in Biological and Medical Sciences Including Biochemistry, Communicable Disease and Immunology, Internal Medicine, Physiology, Psychiatry, Surgery, and Veterinary Medicine. Volume II.
Annual progress rept. 1 Oct 77-30 Sep 78. 1978, 1022p.p
See also Volume 1, AD-A074 241.

No abstract available.

HRP-0023418/7 Not Available NTIS
Philadelphia Health Management Corp., PA.
Health Status in Northcentral Philadelphia.
Executive summary.
Aug 77, 58p
See also Full Report, HRP-0023419, Appendixes A-D, HRP-0023419 -- HRP-0023423.
Available from Systems, Planning and Education Div., Philadelphia Health Management Corp., 530 Walnut St., Philadelphia, PA 19106.

The role of health services in north-central Philadelphia, Pa., which are funded by the Philadelphia Housing and Community Development Agency (CD) is presented. A unique feature of the study is the neighborhood approach. Rather than resource-based planning, population-based planning is employed. A discussion of methodology encompasses data classification and collection, development of geographic subareas, and identification of community priorities. The findings outlined indicate that ethnic factors, poverty, and unemployment strongly affect the area's health status, that CD-funded health services are valuable to the community, and that fund cuts to hospitals would have a negative impact. Critical health issues involve nutrition, cancer, metallic poisoning, inadequate prenatal care, heart disease, hypertension, and infant mortality. Health systems issues relate to older people, health education, dependence on pubiic funds, nonemergency transportation, and bilingual services. The need for service coordination in long-range planning is stressed. It is recommended that CD health services be continued, that specific plans be made with each contracting provider, that uniform contracting/audit/management plans be adopted for contracts, that new program objectives be defined, that refinancing contingency plans be developed in case of fund cuts, and that the health resources directory be maintained. Five tables of indicators, a summary of sources for selected indicators, and three maps are provided.

HRP-0023420/3 Not Available NTIS
Philadelphia Health Management Corp., PA.

Health Status in Northcentral Philadelphia. Appendix A -- Data Tables.
1977, 314p
See also Executive Summary, HRP-0023418, Full Report, HRP-0023419, Appendixes B-D, HRP-0023421 -- HRP-0023423.
Available from Systems, Planning and Education Div., Philadelphia Health Management Corp., 530 Walnut St., Philadelphia, PA 19106.

Appendix A to the 1977 report on health status in north central Philadelphia, compiled by the Philadelphia Health Management Corporation (PHMC) under a contract with the Philadelphia Housing and Community Development Agency, contains data tables. Maps illustrate census tracts, neighborhood groupings, race/ethnicity by census tract, eastern north Philadelphia within north central Philadelphia, and medically underserved areas of north central Philadelphia. Data in the tables relate to population, socioeconomic and perceptual indicators (demographic characteristics, characteristics of the aged, unemployment rates, vacant residential structures); personal health status indicators, including vital statistics (natality, mortality, and fetal, neonatal, and infant deaths) and morbidity (reportable disease, conditions of interest, Early and Periodic Screening Diagnosis and Treatment, mental health/mental retardation); financial characteristics of the delivery system; resource indicators as shown in the Physician's Survey; and indicators of population utilization and ambulatory facilities utilization, as well as relevance and commitment indices.

HRP-0023421/1 Not Available NTIS
Philadelphia Health Management Corp., PA.
Health Status in Northcentral Philadelphia. Appendix B -- Data and Methodology.
1977, 130p
See also Executive Summary, HRP-0023418, Full Report, HRP-0023419, Appendix A, HRP-0023420, Appendixes C-D, HRP-0023422 -- HRP-0023423.
Available from Systems, Planning and Education Div., Philadelphia Health Management Corp., 530 Walnut St., Philadelphia, PA 19106.

Appendix B to the 1977 report on health status in north central Philadelphia deals with data and methodology. Data bases created for ambulatory health systems analysis and planning include the following: ambulatory health service resources; the elderly; Early and Periodic Screening, Diagnosis and Treatment; mental health/mental retardation; the National Center for Health Statistics -- Vital health Statistics Series; Northcentral Organized Regionally for Total Health, Inc. (NORTH) Health Perceptions Survey; patient origin information; the Philadelphia Health Management Corporation (PHMC) 1977 Ambulatory Care Study, and Ambulatory Encounter Survey; the PHMC 1973 Household Interview Survey; the PHMC 1977 Physician's Survey; reportable diseases, mortality, and natality for Philadelphia County; residential vacancy rates; unemployment; and the 1970 U.S. Census. Special methodologies used for data collection and application e.g., geographic groupings, and health status indexes are described, together with the weaknesses of the data bases listed. It is emphasized that data employed in the report come only from the most complete year, so that an entirely accurate picture cannot be drawn. Exhibits encompass forms, examples of composite health status indexes, a bibliography, information required from ambulatory health care providers, and a NORTH survey cover letter and questionnaire.

HRP-0025445/8 Not Available NTIS
Institutional Care of the Young Chronically Disabled.
Noel Wilton. 1978, 3p
Pub. in the Medical Jnl. of Australia v1 n3 p150-152 11 Feb 78.

This article argues that the young, chronically disabled would benefit if residential care units suited to their needs were established. The problems that must be faced by the handicapped, e.g., their own helplessness and society's view of them as inferior beings, are discussed. The necessity for meeting the needs of the handicapped without accentuating their disabilities is stressed. Needs which arise from institutionalization are considered; the lack of real work and leisure pursuits are cited as two major problems. The inability to satisfy sexual needs is also a major consideration. Problems which the staff in institutions for the disabled may encounter are outlined, including the staff members' frustration at the realization that patients will never recover completely. If the staff of an institution were trained in understanding and coping successfully with their patients' emotional disturbances, some staff members' frustration may be alleviated. It is suggested that each patient have his own room. This would enable him to have privacy. The staff should be trained to provide the patient with emotional support.

HRP-0025546/3 Not Available NTIS
Tunbridge Wells Health District (England).
Resource Allocation.
S. J. Senn, and H. Shaw. 1978, 6p
Pub. in Jnl. of Epidemiology and Community Health v32 n1 p22-27 1978.

Anomalies in the formula of the Resource Allocation Working Party (RAWP) report are identified to indicate how they may affect revenue allocation within a health region. Most criticisms are directed toward the treatment of flows of patients and adjustments to resident populations. Points made are considered under the headings of the various populations devised by the resource allocation method, citing pertinent pages of the RAWP report. These populations and services are for nonpsychiatric inpatients, day and outpatients, and psychiatric patients. The problems of dealing with varying admission rates for inpatients and of allocating revenue for outpatient services are discussed. Correlation of inpatient and outpatient attendance and services in selected health districts suggests that the RAWP basis of calculation is inadequate. It is suggested that resources for services could be better allocated by inpatient catchment areas than by resident population. An oversight in recommendations concerning psychiatric services -- failure to identify the appropriate weighting factor to be used in combining adjustments for movements of patients across administrative boundaries -- is discussed. It is concluded that the proposed national formula should not be applied for the purpose of revenue allocation at district levels in its present form.

HRP-0025547/1 Not Available NTIS
Avon Area Health Authority, Bristol (England).
Subregional Resource Allocations in the National Health Service.
A. H. Snaith. 1978, 6p
Pub. in Jnl. of Epidemiology and Community Health v32 n1 p16-21 1978.

The argument is advanced that the national formula proposed by the Resource Allocation Working Party for the identification of both regional and district financial targets is not a valid instrument for that purpose. The party's report represents a theory of health service planning based on wide variations in expenditures between regions and an inverse relationship between morbidity and expenditures. But manipulation of available morbidity and mortality statistics in Great Britain shows that the standard statistical regions vary in rank order for morbidity classifications and that the region ranking fourth in terms of overall mortality ranks first in terms of morbidity. Use of morbidity and mortality statistics alone would thus be an inadequate basis for apportioning resources among regions. Greater precision concerning causes of death and therefore morbidity and needs in individual localities is not believed attainable for comparative purposes in the smaller districts. Furthermore, it is claimed that research into medical needs and outcomes is inadequate to bring about real changes in resource distribution at local levels unless it is recognized that health authorities can meet needs in different ways and that a change in resource management from institutional to service budgeting is required. It is concluded that at the local level, abstract manipulation formulas cannot have a strong influence, indicating the need for a more sensitive theory of need and means of provision.

HRP-0025641/2 Not Available NTIS
Emergency Nurse Practitioner.
Denise Geolot. 1978, 2p
Pub. in the Nurse Practitioner v3 n3 p12, 28 May-Jun 78.

Trends in emergency health care have led to the creation of the emergency nurse practitioner role in many emergency care facilities. While the traditional purpose of the emergency room (providing basic and advanced life support measures in true emergencies and treatment for perceived emergencies) remains the same, this function has been expanded to include primary access to the health care system. To function effectively, the emergency nurse practitioner's role must combine both primary and acute care. The emergency nurse practitioner provides the primary care functions of health assessment and education, screening, and triaging of patients to appropriate resources. The nurse practitioner independently initiates a care plan based on the assessment, although working closely with the physician. The acute care component of the emergency nurse practitioner's role focusses on assessment and initial management of urgent and emergent problems and varies according to the needs of the situation. When a physician is not immediately available, the emergency nurse practitioner can avoid complications which might result from delays in treatment. Emergency measures can be initiated by providing and maintaining basic life support until a physician arrives. The emergency nurse practitioner can be active in teaching, developing the nursing staff's potential for improving health care services, training paramedical personnel, and developing emergency medical health care systems in the community.

HRP-0026371/5 Not Available NTIS
Scottish Home and Health Dept., Edinburgh.
Development of the Nursing Services in Scotland.
1978, 16p
Pub. in Nursing Mirror v146 n18 pi-xvi 1978.

Improvements made in nursing services offered in Scotland, especially through nurse education, manpower planning, and research, are outlined. Service needs are affected by the sparsity of the population in rural areas and the scattered population in others, making special transportation and professional isolation particular problems. Nurses must be able to function independently as district nurses, midwives, and health visitors. Topics discussed include: calculation of the number of nurses required using the Aberdeen formula, establishing new nursing colleges, and developing individual care plans; planning through a new multidisciplinary Health Planning Service with special nursing officers and an advisory National Nursing and Midwifery Consultative Committee; manpower planning considering community variations, age on leaving, management aid analysis, the organization of midwife services (family planning, special courses in labor and intensive care, followup care, care problems in the Highlands and islands); planning play for children in hospitals; long-term health care for the mentally handicapped, the elderly, and the young chronically ill; improvement of nursing education by increasing nursing teaching staff and support staff in nursing colleges, expanding nursing college libraries, amalgamating colleges of nursing and midwifery, offering graduate nurse and master's education opportunities and development of a modular comprehensive educational program. Three tables are supplied.

HRP-0026721/1 Not Available NTIS
Dutchess Community Coll., Poughkeepsie, NY.
Eliminating Health and Hospitals Corporation -- Proposal to Improve Hospital Care While Saving Money.
Donald H. Puretz. 1978, 5p
Pub. in New York State Jnl. of Medicine v78 n8 p1314-1318 Jul 78.

The effectiveness of the Health and Hospitals Corporation (HHC) of New York was assessed based on media discussions of its practices, outcomes, and valuation by organizers and users. The HHC was created in 1970 with the mission of providing and delivering comprehensive care and treatment for the physical and mental diseases of New Yorkers as effectively and efficiently as possible with available resources. The HHC provides care for over 1.5 million patients in 4 million days of inpatient care and 5 million ambulatory care visits on a payroll of over $400 million. The basic problems of the HHC include lack of fiscal accountability, inefficiency, poor patient outcomes, suspected dishonesty, incompatibility of practices with goals,

and extensive dependence on untrained staff members. The general perception is that patient care in HHC institutions is poor and getting worse. It is suggested that whereas prior to Medicaid there was a need for a municipal hospital system, there is now no essential reason for continuation of such systems, especially given the surplus of beds and the large operating loss and capital expense to the government agency. The disbandment of the New York City HHC is proposed. The effects of disbandment are estimated. The conclusion is that New York City residents could be served less expensively and more effectively by voluntary and proprietary hospitals.

HRP-0026744/3 Not Available NTIS
Interdisciplinary Teamwork in a Community SRO.
Evelyn Bohm. 1978, 6p
Pub. in Jnl. of Psychiatric Nursing v16 n7 p25-28 Jul 78.

An assistance program for residents of one of New York City's single room occupancy hotels, who were discharged from mental hospitals to that residence is described. The program is staffed by a multidisciplinary community mental health team and is aimed at interceding in the rehospitalization cycle. The program works to develop a psychotherapeutic community-oriented residence which encourages growth, mutual self-help, and independence and to strengthen the various natural social groups in the hotel. The psychiatric services include supportive counseling, chemotherapy, social rehabilitation, and strengthening of peer group autonomy. The staff actively seeks out and treats clients in their rooms if they are either withdrawn or behaving erratically. If psychiatric hospitalization is indicated, the workers arrange it. In addition to verbal types of therapy, there are also groups in dance, music, cooking, bingo, arts and crafts, and travel: these are used to increase socialization, decrease rigidity, develop self-awareness, give insight into behavior, and develop leadership and decisionmaking skills. Problems encountered with community opposition to the use of the hotel for mental patients are discussed. It is concluded that the program has resulted in shorter psychiatric hospitalizations at greater intervals.

HRP-0026750/0 Not Available NTIS
Rocky Mountain Poison Center, Denver, CO.
Regionalization of Poison Centers -- A Rational Role Model.
Barry H. Rumack, Pam Ford, John Sbarbaro, Peter Bryson, and Marilyn Winokur. 1978, 9p
Pub. in Clinical Toxicology v12 n3 p367-375 1978.

A model system for a regionalized poison center, the Rocky Mountain Poison Center, is described. Five major hospitals outside the Denver metropolitan area were selected as subregional centers because of their geographic distribution and interest and because of the availability of 24-hour emergency service. Their primary mission was to care for the poisoned patient in the community and to serve as the initial source of information for local physicians and the public. Each center collects statistics, provides semiannual onsite, inservice education, provides yearly onsite physician education, maintains the computer-generated microfiche poison information system (POISINDEX), maintains a xerox telecopier for transmission of poison information, promotes public education on poisons, and performs poison-related research. Minimal cost is achieved by concentrating expensive equipment and information materials in the main center, with rapid access to information through the POISINDEX. Funding has come from various sources, including a cost-sharing program in which 18 Colorado hospitals participate.

HRP-0026768/2 Not Available NTIS
Maryland Univ. at Baltimore. School of Social Work and Community Planning.
Attitudes Towards Symptoms and Services in the Ethnic Family and Neighborhood.
Donald V. Fandetti, and Donald E. Gelfand. 1978, 10p
Pub. in American Jnl. of Orthopsychiatry v48 n3 p477-486 Jul 78.

The family's role in managing mental health problems in Italian and Polish working class neighborhoods was studied in a multiethnic section of Baltimore, MD. There are also enclaves of German and Greek residents there who are still ecologically separate from the other two ethnic groups studied. The mental health attitudes of family members (51 women and 49 men) between the ages of 21 and 50 were surveyed. The socioeconomic and demographic backgrounds of respondents were similar. Because of their proximity to and interaction with kin, the respondents appear to be part of a traditional extended family structure. Seventy percent of the sample live in the same section of the city as their parents, over 40 percent of siblings live in the same neighborhood, and 30 percent live in the same city. The survey explored the extent to which symptoms of mental disorder are perceived as problematic and the extent to which specific members of the family circle are called upon for assistance in dealing with such problems. The results showed that mental health specialists frequently are not perceived as the appropriate agents for meeting problems beyond the expertise of the family and local community. The implications of these findings for community mental health are examined and it is concluded that mental health services offered in ethnic neighborhoods should be organized to facilitate access and linkage to a wider base of mental health and social service resources by strengthening information and referral functions in existing services.

HRP-0026775/7 Not Available NTIS
Rogue Valley Memorial Hospital, Medford, OR.
Employers' Evaluations of New Graduates.
Farley J. Howell. 1978, 4p
Pub. in Nursing Outlook v26 n7 p448-451 Jul 78.

The results of a survey to evaluate 86 Oregon hospital directors' views on diploma, baccalaureate, and associate degree nurses are presented. The survey questionnaire consists of two sections. One is for assessment of technical bedside skills and professional nursing skills, as well as for ranking. A second section pertains to hospital bed supply, pay scales, and the relationship of educational background to advancement for nurses. The findings for the 50 questionnaires returned indicate that in small hospitals, diploma nurses are preferred in all skills except learning new concepts, while in large hospitals the baccalaureate nurse is ranked superior in learning new concepts, adaptability, conscientiousness, and initiative, with the diploma nurse superior in technical and other skills. The associate nurse receives low marks for both hospital sizes. Directors of small hospitals do not favor salary differentials or consideration of education for advancement, while large hospital directors support salary differentials and note the importance of education for advancement. Small hospitals thus tend to value diploma nurses for their technical skills and are reluctant to pay more for unneeded leadership skills. Large hospitals, on the other hand, require process and specialized skills for their programs. Respondents consistently rate graduates with education similar to their own as superior. It is concluded that associate nurses lack the support of nursing directors and the strong technical background which is ostensibly their strength. One table is furnished.

HRP-0026781/5 Not Available NTIS
Chicago Univ., IL.
Variations in State Medicaid Programs.
Stephen M. Davidson. 1978, 17p
Grant DHEW-AOA-90-1027
Pub. in Jnl. of Health Politics, Policy and Law v3 n1 p54-70 Spring 1978.

A measure to aid analysis of State Medicaid programs was developed and demonstrated. The Medicaid Program Index (MPI) was developed to differentiate among State Medicaid programs according to four characteristics: inclusion of the medically indigent, optional services covered, limitations on provision of basic services, and arrangements for paying providers. There is evidence that the States vary widely on these factors, which can be analyzed in the aggregate using the MPI, or separately. Other uses for the MPI are identifying State program variations, accounting for State program differences by comparing them to explanatory variables, identifying trends in program characteristics over time, and developing hypotheses explaining the trends. The use of the MPI in analysis of trends over time is demonstrated and trends revealed by the results of the MPI for 1970 and 1975 are outlined. It is concluded that similar measures could be developed to aid in analyses of other Federal and State programs in which interstate variation is an important characteristic.

HRP-0026787/2 Not Available NTIS
Lower Columbia Coll., Longview, WA.
Organization of Nursing Services.
Timothy Porter-O'Grady. 1978, 8p
Pub. in Supervisor Nurse v9 n7 p30, 32-38 Jul 78.

The matrix organizational model for uniting nursing structure and practice is outlined. The model combines a variety of specialists performing temporary tasks consistent with overall organizational goals. Power and responsibility are shared equally by all members of the team. Components of the model are: the administrator for nursing services, the key leadership person responsible for planning, leading, and organizing the entire department, coordinating the staff, and designing objectives; the nursing administrator, invested with major decisionmaking and strategy development; the patient care manager, who coordinates the clinical activities of nurses; the patient care management council, which addresses issues affecting overall unit goal and activity planning, as well as management problems; the director of education and research, who seeks to develop new knowledge for improved nursing care and to orient new practitioners with a structured program; the clinical nursing director, supervising activities of the clinical specialists, the discharge coordinator, and the staffing classification coordinator; and the primary nurse, who plans and evaluates nursing care for the individual client on a 24-hour basis and links various departmental and professional services. It is stressed that the patient is the focus of the organization and the primary nurse assures placement of patients at the center of the delivery organization.

HRP-0026800/3 Not Available NTIS
Parkview Hospital, Philadelphia, PA.
Zeroing in on the Voluntary Effort -- One State's Approach.
Irvin S. Berland. 1978, 2p
Pub. in Osteopathic Hospitals v22 n7 p12-13 Jul-Aug 78.

Pennsylvania's Voluntary Health Care Cost Containment Committee is discussed. The committee used as guidelines a 15-point program ranging from reduction in hospital expenditures and new capital investment to expanded utilization review. State-level implementation was planned, with the national committee to review various State plans. The program was directed not only at hospitals, but at the entire health care system. Input was sought from business and labor sectors, representatives of commercial and health insurance industries, health planning agencies, hospitals, and physicians. The objectives of the group were defined in terms of the 15-point program to contain the rising cost of health care while maintaining high quality and appropriate accessibility for all Pennsylvania residents through the voluntary and cooperative efforts of all health delivery service participants. Support for the program objectives was solicited through audiovisual presentations and letter-writing campaigns. The work of subcommittees focusing on promotion and communication, medical staff activities, external cost factors, capital costs and planning, administrative processes, and productivity is described. The preliminary conclusion about the Pennsylvania effort is that self-regulation by the health care industry is possible if every industry segment accepts the guidelines and objectives proposed.

HRP-0026817/7 Not Available NTIS
Michigan Univ., Ann Arbor. Dept. of Psychology.
Plight of the Nurse in Community Mental Health Centers.
Ira Strumwasser, Cary Cherniss, and Edward S. Egnatios. 1978, 7p
Pub. in International Jnl. of Nursing Studies v15 n2 p67-73 1978.

Training, competence, and formal supervision of mental health nurses compared to that of paraprofessionals and non-nursing health personnel are examined to assess the need for further inservice training. The data derive from questionnaires administered to a study group encompassing 164 direct service clinical staff members of 19 commu-

nity mental health programs in southeastern Michigan. The results show that nurses rate their previous training experiences as significantly less adequate than that of both other groups, that both nurses and paraprofessionals are consistently less likely than non-nursing professionals to receive supervised experience in each of six areas tested, that nurses report the least self confidence in five of six clinical activity categories, and that nurses tend to have significantly less formal supervision in their current jobs than the other two groups. It is concluded that university-based nurse training programs for nurses preparing for community mental health roles should be more relevant and that supervisors need to be made aware of staff training levels and limitations. A comprehensive training needs assessment is recommended. A bibliography and five tables are furnished.

HRP-0026941/5 Not Available NTIS
Baylor Coll. of Medicine, Houston, TX.
Descriptive and Analytic Study of the Student Health Services of an Urban University.
Michael P. Tristan, Charles C. Cheney, and William J. Novelli. 1978, 4p
Pub. in Jnl. of the American Coll. Health Association v26 n5 p268-272 Apr 78.

The health care needs of University of Houston students were described and evaluated on the basis of a 6 percent stratified random cluster sample of the student body. A questionnaire was used for data collection. The results were intended to provide a comprehensive, cross-sectional portrait of the student population, actual and perceived health care needs, and strategies used to meet the needs. The findings were compared with data on student populations of more traditional, residential universities as reported in the literature. Students at the Houston University were older, employed, attended classes part-time or evenings, married, with dependents, and lived at home with parents and/or at a distance from the campus. Utilization of the University of Houston student health center was affected more by the demographic and social heterogeneity of the students than by inferred or reported health needs or knowledge of and attitudes toward the health center. The students apparently used traditional alternate strategies for meeting their health care needs at off-campus sites. The conclusion was that planning for student health services at large urban commuter institutions should be based on nontraditional university population and needs models.

HRP-0027061/1 Not Available NTIS
Department of Health and Social Security, London (England).
National Health Service Laboratories in England, 1966-74.
M. A. Buttolph. 1977, 7p
Pub. in Jnl. of Clinical Pathology v30 n12 p1103-1109 1977.

The National Health Service (NHS) of England provided data on laboratory operations for the period 1966-74 which were analyzed to reveal trends and to indicate probable future changes in services. Information was sought on laboratory workloads, the number of laboratories, and their productivity rates. The data analyzed refer to analytical services provided and not to other work involved, such as teaching, research, and consultation. In the period studied, the number of such laboratories decreased from 641 to 500 (down 22 percent). Also, the number of small laboratories decreased, and the number of large laboratories increased. During the period studied, there were exponential increases in the total number of requests for service and in the numbers of such requests received in the areas of hematology, clinical chemistry, and bacteriology. The total workload increased from about 30 million requests in 1966 to nearly 50 million in 1974. An increase of 7 percent in the amount of work received from sources other than the main hospitals served was noted. Productivity data were difficult to compile and analyze since the figures for medical laboratory technicians employed prior to 1974 were not exact and the effect of automation was unknown. Two major trends were identified: an increase in workloads and the changing structure of the laboratory service. It was concluded that these trends are likely to continue, but within the current economic situation, the ability to accommodate increased demand will serve as a constraint to future development.

HRP-0027126/2 Not Available NTIS
Southeastern Wisconsin Health Systems Agency, Inc., Milwaukee.
Two Hospitals Consolidate Services to Save $375,000 Annually.
Mark Chambers, and Richard Russell. 1978, 2p
Pub. in Forum v2 n3 p14-15 1978.

Consolidation of obstetrical and pediatric units of two Kenosha, Wis., hospitals illustrates cost containment through reduction of excess hospital capacity. To balance the revenue loss to one hospital of closing an inefficient obstetrical unit, the hospital receiving the consolidated obstetrical unit has closed its pediatric unit in favor of the other hospital, with a total savings of $375,000. Analysis of possible cost reduction from consolidation involves comparison of variable costs (especially nursing staff) per unit at current delivery levels with projected variable costs of a single combined obstetrical service. An important consolidation repercussion to be considered is cost distributed to other units from loss of a particular unit, resulting in higher overall rates for maintenance of financial stability. Negative fiscal impact is avoided by replacement of the consolidated unit with another revenue-generating unit. Cost savings are estimated and the contribution of the unit to the hospital's overhead is compared to that of the unit lost through consolidation. It is concluded that health systems agencies are in a unique position to bring about such cost containment actions by promoting community awareness of excess hospital capacity and documentation of reduction benefits.

HRP-0027145/2 Not Available NTIS
Eastern Virginia Medical Authority, Norfolk.
Health Professions Education and Public Policy -- A Research Agenda.
Richard M. Magraw, Daniel M. Fox, and Jerry L. Weston. 1978, 8p
Pub. in Jnl. of Medical Education v53 n7 p539-546 Jul 78.

Health professionals from the fields of medicine, dentistry, nursing, and the allied health professions formed a Work Group on the Education of the Health Professions and the Nation's Health to investigate why little useful knowledge has been derived from research in this area and to suggest more productive approaches for the future. The group identified discontinuities among the needs of patients and populations and the way in which health professionals are taught and practice what is taught in professional schools. Recommendations for priorities in research were organized under seven themes; three relate education to practice or health status, two relate issues of practice to education or health status, and one relates issues of health to education and practice. It was concluded that adoption of research in these areas could foster a reciprocal relationship between practice and education and between education of health professionals and improved health status of the treated population. The aim would be to integrate the values of health professionals with those of patients to effect better health status through health professions interventions.

HRP-0027219/5 Not Available NTIS
Vanderbilt Univ., Nashville, TN. School of Nursing.
On National Health Insurance.
Ingeborg G. Mauksch. 1978, 5p
Pub. in American Jnl. of Nursing v78 n8 p1323-1327 Aug 78.

Conclusions on national health insurance reached by the Advisory Committee on National Health Insurance under DHEW Secretary Joseph Califano are discussed by the only nurse on the committee. National health insurance is deemed necessary because less than one-half of the population is protected against catastrophic illness, most private companies do not cover health maintenance or drugs, and the costs of illness are escalating. Any insurance legislation must involve: administration at several levels of Government; funding through premiums, withholding taxes, general revenues, excise taxes or a combination; benefits similar to Medicare and Medicaid; cost and reimbursement quality control; manpower distribution, utilization, quality, and education; research in illness-care systems and health care delivery; and delivery system reform with change in providers' attitudes and the public's knowledge of self care and health maintenance. Four plans are advanced: 1) public guaranteed health protection, providing universal mandatory coverage unless the individual opts for a private plan, 2) the target plan focusing on persons left out of the extant network, 3) the consumer choice health plan, covering major health expenses, but leaving consumers liable for some costs to make insurance and health care markets competitive, and 4) a quasi-public corporation. This corporation would administer health insurance by enrolling all U.S. residents and regulating health providers. A short bibliography and a list of advisory committee members are appended.

HRP-0027222/9 Not Available NTIS
West Virginia Univ., Morgantown. Dept. of Health Education.
Study of the Health and Sickness Behavior of Selected Adults in Southeastern Kentucky.
Bill Carlton. 1978, 6p
Pub. in Public Health Reports v93 n4 p356-361 Jul-Aug 78.

The results of an attitude survey on health care service in Harlan and Bell Counties of eastern Kentucky are reported. The data derive from survey interviews of 300 persons (mostly women) representing 20 households in each of 15 communities. The technique of the Research Division of the National Educational Association, and multistage sampling by district, community and household were used for data collecting. The findings indicate that the typical woman perceives a number of illnesses as major health problems, realizes that people can unknowingly have cancer, diabetes or heart trouble if they do not know symptoms, derives most of her health information from friends and relatives, and would like to know more about disease (pneumoconiosis, emphysema, and diabetes), family planning, and nutrition. She thinks about but seldom discusses her own health, which she rates as fair to poor; she rates her husband's health the same and her children's as good. She does not have regular medical and dental examinations, while recognizing their value. Dissatisfaction with medical care is voiced because of long waits in the physician's office, lack of personal interest by health care personnel, lack of information, and cost. It is concluded that diseases and disabilities are perceived by the population as part of its lifestyle and that socioeconomic characteristics determine whether preventive care is sought. Joint definition of common objectives by health care practitioners and families would promote family resource mobilization for health. Data from the questionnaires are reported in four tables.

HRP-0027264/1 Not Available NTIS
National League for Nursing, Inc., New York. Div. of Hospital and Long-Term Care Facility Nursing Services.
Criteria for Appraisal of Departments of Nursing.
1978, 39p
Available from National League for Nursing, 10 Columbus Circle, New York, NY 10019.

Prepared by members of the National League for Nursing, these 28 criteria are intended to facilitate the evaluation of departments of nursing in hospitals and long-term care facilities. Participants represented both acute and long-term care settings. Each criterion is succinctly stated and followed by a rationale for its inclusion. The criteria fall into three broad groups: criteria that refer to the agency as a whole, those that refer to the department of nursing as a system, and those that refer to nursing and other agencies. The topics range from informed consent for research with human subjects to assurance of a therapeutic and safe institutional environment and systems for appraisal of personnel performance. Clinical guidelines for selected nursing care procedures and practices are required, as is an effective system for documenting nursing care that is based on nursing process and outcome measures. Each department of nursing must also have a quality assurance program for evaluating, safeguarding, and improving the quality of nursing care and in order to meet Federal, State, and accreditation-body regulations. Criteria dealing with personnel involve hierarchical organization, staffing, and staff development. An annotated bibliography is provided.

HRP-0027377/1 Not Available NTIS
Memorial Sloan-Kettering Cancer Center, New York.

Priorities in Cancer Nursing Research.
Marilyn T. Oberst. 1978, 10p
Pub. in Cancer Nursing v1 n4 p281-290 Aug 78.

The Delphi technique was employed to survey a panel of 575 nurses to determine research priorities for cancer nursing. Of 254 nurses completing all three rounds of the Delphi technique, 62 percent were engaged at least part-time in direct patient care. Participants came from cancer centers, general hospitals, community health agencies, and schools of nursing. They rated the following 10 items as having the greatest impact on patients' welfare: (1) methods of relieving therapy-induced nausea and vomiting; (2) nursing interventions for the relief of pain; (3) effective discharge planning and followup programs; (4) nursing interventions that assist patients and families in coping with grief and impending death; (5) effective ways of preventing and/or treating stomatitis resulting from chemotherapy; (6) effective techniques for venipuncture, maintenance of intravenous lines, and preservation of veins for long-term antibiotic therapy or chemotherapy; (7) modifications in physical facilities, nursing care programs, and policies that promote comfort and dignity for the hospitalized terminally ill individual; (8) effective analgesia protocols; (9) effective methods of psychological support for patients and families; and (10) the dying patient's right to make decisions about health care programs and efficient mechanisms for the exercise of these rights. Comparative rankings of cancer nursing research priorities for various care settings are discussed. Supporting data are provided.

HRP-0027523/0 PC **A06**
Alpha Center for Health Planning, Bethesda, MD.
Group Process and Decision-Making -- Participants Manual.
Sep 78, 114p

The materials used by health planning participants in a 1978 conference on group processes and decisionmaking are provided. Information and documents include: a program, as well as faculty and participants lists; a form to measure group concepts; exercises to develop skill in health systems agency decisionmaking, with the Health Systems Agency of Northeastern New York as an example of decisionmaking about board size and structure; a health questionnaire for organizations; notes on communication theory; an outline of behavior patterns, including collusive behavior, the individual need to influence, and the effects of nonverbal behavior; group norms, and an instruction sheet for fishbowl activity and role-playing; a list of interventions which produce positive results in group interaction and an instruction sheet for related fishbowl activities; priority-setting memoranda and goal lists on identifying problem areas, revising the health systems plan, and developing the 1979 annual implementation plan of the Health Systems Agency of Northeastern New York, Inc.; and group report-out session forms for each participating group, including a group report form and a form on conducting better meetings and working effectively with groups.

HRP-0027565/1 Not Available NTIS
Cleveland State Univ., OH. Dept. of Social Services.
New Role for the Registered Nurses (RN's) -- Discharge Coordinator.
Frances L. Thoms, and Rita Mott. 1978, 2p
Pub. in Hospital Progress v59 n2 p38, 40 1978.

The use of registered nurses (RN's) as discharge coordinators at St. Vincent Charity Hospital in Cleveland, Ohio, is described. Traditionally, the social worker has worked with the patient and his family in discharge planning and consideration of placement alternatives, as well as in supportive counseling for decisionmaking during hospitalization. This approach is limited by the social worker's dependence on physicians for medical information and transfer forms. RN's have been introduced to speed up completion of forms for aftercare treatment. The social worker still serves as primary planner and support giver while RN's help families make informed choices. The RN discharge coordinator prepares a book with pictures and information on each institution, evaluates the medical needs of the patient, and interprets social work services to the nursing staff. An RN discharge coordinator could also be hired as part of the nursing staff, but that would limit the social worker's involvement and the team approach. The new system shortens the stay of patients awaiting aftercare, makes informed placement choices possible, and develops cooperative relationships between nursing and social service staff.

HRP-0027610/5 Not Available NTIS
American Telephone and Telegraph Co., Basking Ridge, NJ.
Issue of Confidentiality -- A Perspective From the Nursing Profession.
Muriel S. Pappert. 1978, 6p
Presented at a Conference on Ethical Issues in Occupational Medicine, held at the New York Academy of Medicine, June 21-22, 1977.
Pub. in Bulletin of the New York Academy of Medicine v54 n8 p758-763 Sep 78.

The implications of fair information practice principles for occupational health nurses are discussed. The five major principles state that no secret personal data recordkeeping is allowed, that individuals must have access to their records to prevent information obtained for one purpose from being used for another and to be able to correct errors, and that data organizations must assure data reliability and prevent misuse. The occupational nurse should inform company employees of the existence of records, review the records with them, make all health care staff aware of their responsibility for confidentiality, assist the physician in establishing guidelines for appropriate employee access to the health records, and safeguard any confidential information obtained about patients, disclosing relevant information only for the patient's benefit. The occupational health nurse's principal conflict is likely to occur between the worker's privacy and the need for a report to management about the worker's health status. It is recommended that the nurse learn company policies regarding data release procedures, benefits, record retention, and release of privileged communications or help to institute records procedures if none exist. The nurse should keep abreast of laws through professional organizations, administrative health agencies, journals, conferences, and legal counsel.

HRP-0027616/2 Not Available NTIS
Moses Taylor Hospital, Scranton, PA.
Goal Setting.
Phyllis J. Snyder. 1978, 3p
Pub. in Supervisor Nurse v9 n9 p61-62, 64 Sep 78.

Techniques to assist nurses in writing goals and discharge plans tailored to individual patients' needs are presented. Goals should be stated simply and specifically, they should be realistic (i.e., acceptable to the patient), and they should serve as motivation to the patient to meet further goals. Problems to be avoided are confusion of nursing actions with the goals to be attained in the patient, broad statements of objectives without specifics, and medical goals (i.e., determining the cause of pain) rather than patients' goals. Short-term goals relate to the patient's immediate needs, while a long-term goal defines the highest outcome which can be expected, including knowledge, skills, and support needed. The discharge plan describes what the patient must know and do when he leaves the hospital, including involvement with a community agency, family education, and procurement of necessary supplies and equipment. The plan should be started at admission to avoid a rush immediately before discharge. Appropriateness and timing of short-term and long-term goals in relation to each other should always be considered. A bibliography and a list of goal examples are furnished.

HRP-0027802/8 Not Available NTIS
Occupational Health Nurses (OHN's) Are in the Best Position to Help Workers Fight Alcoholism.
Miriam A. Guida. 1978, 5p
Pub. in Occupational Health and Safety v47 n5 p48-52 Sep-Oct 78.

The involvement of occupational health nurses (OHN's) in company-sponsored substance abuse programs is advocated. It is argued that the expanded-function nurse can play a crucial role in returning employees to productivity by implementing substance-abuse programs with early intervention and followup, as well as with union and management involvement. The nurse is often in a position to identify the disease before it becomes symptomatic, particularly when in contact with people not seen by other health professionals. Nurses well-suited to such work possess a high tolerance for frustration, the ability to strike a balance between dependence and independence, and the ability to assess what cannot be done. The nurses' involvement requires awareness of the need for a definite abuser policy, of the nurses' function in employee education, of their role in emergency situations, and of the potential of the interview situation during health examinations. In industry, the OHN is most likely to identify abusers and to organize abuse programs, while in the hospital the nurse must not protect coworkers and must alert hospital authorities when substance abuse problems exist. OHN continuing education should cover the physiological, psychological, and social implications of abuse, as well as possible interventions. One type of program consists in coordination by a company vice-president of nurses stationed in each branch to perform motivation interviewing, referral, and followup.

HRP-0027816/8 PC **A08/MF A01**
Arkansas Dept. of Health, Little Rock.
Arkansas Vital Statistics, 1976-1977.
1977, 168p

Selected vital statistics for the State of Arkansas are presented for 1976 and 1977. Definitions are provided as are vital statistics formulas. Symbols used in the report are defined. Birth, death, marriage, and divorce records were compiled to form the sources for the tables contained in the report. The Division of Health Statistics has attempted to show significant statistical data covering all vital events in a particular county in a two-page summary. A comparison between 1976 and 1977 is included for each statistical category. When data apply to births, deaths, and stillbirths, the data are published by county of residence; however, when data apply to marriages, divorces, and abortions, they are shown by county of occurrence. Births and deaths of Arkansas residents in States other than Arkansas are not included. The population data used in the State and county summaries are estimates.

HRP-0028141/0 Not Available NTIS
Western Interstate Commission on Higher Education, Boulder, CO. Regional Program for Nursing Research Development.
Nursing Care of Oncology Patients Receiving Chemotherapy.
Jean L. Lum, Marybeth Chase, Sandra M. Cole, Alison Johnson, and Jeanette A. Johnson. 1978, 7p
Grant PHS-NU-00415
Pub. in Nursing Research v27 n6 p340-346 Nov-Dec 78.

Relationships between selected nursing activities and outcomes of oncology patients receiving chemotherapy were explored and specific activities were identified: (1) providing information on the chemotherapy regime; (2) involving patients in their own care; and (3) allowing patients to control their activities and specific outcomes according to their knowledge, degree of cooperation, self-esteem, and level of anxiety. It was then necessary to determine where relationships between nursing interventions and patient outcomes might fit in with the body of literature on oncology and patient outcomes. It was assumed that patients need health information to care effectively for themselves, that cooperation with nursing recommendations is essential to successful treatment outcomes, that nursing activity and patient outcome variables are measurable, that the quality of nursing care is measurable in terms of patient outcomes, and that most hospitalized persons experience some degree of anxiety. Fifty-seven patients in six public and private nonprofit general hospitals were included in the study, and 37, or 65 percent were males. The mean age of patients was 50.8 years. Questionnaire data indicated that the content and quality of the explanation given for treatment and the care regime were positively correlated with patients' self-esteem, and with their knowledge base.

HRP-0028142/8 Not Available NTIS
Ohio State Univ., Columbus. School of Nursing.

Methodologic Framework to Study Nurse-Patient Communication.
M. Jean Daubenmire, Sharon S. Searles, and Carol A. Ashton. 1978, 8p
Pub. in Nursing Research v27 n5 p303-310 Sep-Oct 78.

A methodology was devised for assessing the complexity of interactional processes among nurses and patients in the hospital setting. Principles from general systems theory and communication theory served as a basis for the study. To obtain time series data on interactions between patients and health care personnel, a patient's room and the recovery room in a Columbus, Ohio, hospital were equipped with an audiovisual recording system. Data were collected from the time a patient was hospitalized through discharge for approximately 16 hours per day. Of 1,902 interactions observed, 906 involved nurse-patient interactions. The methodological framework of the study involved synchronology (the examination of presenting behaviors between two or more persons as they occur, change, and develop over time). Events associated with nurse-patient interactions were structured within the context of synchronology and interactional concepts known as convergence and synchrony were employed to identify interaction patterns. With data collected on four patients scheduled to undergo elective surgery, communicative interaction was conceptualized as dynamic and ongoing and was studied by identifying the observed effects of presenting behaviors on participants. The behavior process was complex, context-related, and multivariate in nature. Illustrations of the methodological framework are included.

HRP-0028160/0 PC **A04**/MF **A01**
North Puget Sound Health Council, Mount Vernon, WA.
Issues and Solutions -- Health-Related Problems of Minorities and the Economically Disadvantaged in the North Puget Sound Region.
26 Sep 78, 61p

An analysis of health-related problems of minorities and the disadvantaged in the North Puget Sound Region (Washington State) is provided to aid in planning for specific needs. Various disadvantaged groups are described in terms of numbers, places of residence, income, housing, and health status. Data on barriers to adequate health care experienced by these groups derive from interviews based on specially prepared questionnaires administered to a nonrandom sample of 3 selected groups (67 Indians, Chicanos, and low-income whites) and to providers (28 from a 4-county area). Issues identified include rude treatment; transportation; deficiencies in consumer awareness of service availability and in understanding of service purpose; consumers' and providers' ignorance of hygiene, nutrition, child-rearing practices, mental health, and drug effects; and inability to pay. Solution efforts undertaken are development of county-specific language banks and of tribal community/hospital liaisons, attempts to get transportation agencies to coordinate transportation, continuation of inservice programs in cultural awareness, and provision of technical assistance to tribes on maternal and child health care. Future plans relate to involvement of minorities in needs assessment and of government in financing to special groups, health systems agency (HSA) recognition of ethnic cultural beliefs and self-determination rights, and improvement of HSA/tribal communication and of providers' awareness of problems. Five tables, two bibliographies and an appendix with sample questionnaires are provided.

HRP-0028247/5 Not Available NTIS
Rochester Univ., NY. Dept. of Preventive Medicine and Community Health.
Liberalized Abortion in Oregon -- Effects on Fertility, Prematurity, Fetal Death, and Infant Death.
Jonathan D. Quick. 1978, 6p
Pub. in American Jnl. of Public Health v68 n10 p1003-1008 Oct 78.

The impact of Oregon's 1969 law, which allows medically induced abortions in cases in which the physical or mental health of the mother might be impaired, is assessed. The study is based on Oregon vital statistics data from 1965 to 1975, including birth, infant death, fetal death, and induced abortion data for Oregon residents only. The age-adjusted fertility rate, rather than decreasing as a result of the freer abortion policy, increased between 1969 and 1970 from 80.8 to 81.5 births per 1,000 women aged 15 to 44. This increase may be attributable to a major underestimation of conceptions prior to 1969 as a result of large numbers of unreported illegal abortions. Significant decreases in the age-specific prematurity rates for women 20 years of age and over were noted, as were significant decreases in the mean annual spontaneous fetal death ratio. It is impossible to distinguish the impact of the abortion legislation from the long-standing downward trend in the infant death rate. There was no evidence that liberalized abortion resulted in a decline in the use of contraceptive and family planning services.

HRP-0028249/1 Not Available NTIS
Montreal Univ. (Quebec). Dept. of Psychology.
Increasing Maternal Participation in the Hospitalization of Young Children.
Ethel Roskies, Madeleine Mongeon, and Bernadette Gagnon-Lefebvre. 1978, 13p
Pub. in Medical Care v16 n9 p765-777 Sep 78.

An experimental program carried out at a large Canadian pediatric hospital which focused on improving maternal involvement with hospitalized children proved largely successful. Mothers of 48 children aged 1 to 5 admitted for elective surgery were divided into experimental and control groups for the study. Mothers in the experimental group received supplementary information about their child's expected course of hospitalization, specific suggestions about when and how to visit, and further clarification and reassurance about specific concerns. Mothers in this group visited for longer periods, sustained visiting throughout the hospital stay, and participated more actively than control mothers in their children's care. One unexpected result of the study was the positive impact of the program on fathers' visits. Fathers in the experimental group visited more often and stayed significantly longer each visit. Moreover, parents in the experimental group spent significantly more of their visiting time actively caring for their children. A major limitation of the program was that it did not help mothers function as collaborators with the nurses in the care of their children. Much of this failure lies with the nurses' inability or unwillingness to modify their traditional role.

HRP-0028267/3 Not Available NTIS
Beth Israel Hospital, Boston, MA.
Primary Care at a Teaching Hospital -- History, Problems, and Prospects.
Thomas L. Delbanco, and John N. Parker. 1978, 18p
Pub. in the Mount Sinai Jnl. of Medicine v45 n5 p628-645 Sep-Oct 78.

The status of primary care at the Beth Israel Hospital in Boston, Mass., before and after the development of a program known as the Beth Israel Ambulatory Care Center (BIAC) is evaluated. Prior to development of the BIAC, patients came to hospital outpatient clinics by habit, often because they felt they had no access to private care. Clinic visits were based on a flat fee schedule, without regard to type of service or length of visit. The average flat fee in 1971 was $16 per visit. The BIAC handles about 15,000 patients (43,500 visits annually on a fee-for-service basis). Clinics have been replaced with a group practice arrangement involving physicians, nurse practitioners and midwives, social workers, and psychiatrists. The group practice is covered 24 hours a day, 7 days a week. One-third of all visits are to nonphysicians (new health practitioners) who function as essential members of the health care team. The BIAC is active in education and research. Problems associated with and prospects for the organization of the BIAC at supervisory/planning, leadership, and staff levels are considered, along with financial and marketing issues, referral patterns, patients' input, the academic program, and physical constraints such as space limitations. The organizational consequences of basing the BIAC program in a teaching hospital are assessed. Supporting data on patients' visits and fees are tabulated.

HRP-0028359/8 Not Available NTIS
Changing Attitudes to Health and Illness -- The Effects on Nursing Practice.
Judith Steiner-Freud, Dina Evron, Tamar Dayan, Lea Zwanger, and Nourith Ben-Dov. 1978, 3p
Pub. in International Nursing Review v25 n5 p143-145 1978.

Cultural influences in the provision of treatment by nurses in Israel are explored, with special attention given to society's changing values concerning health and illness. Israel is a country of immigrants and refugees. Different health problems are presented by different educational and economic strata of society. Technological changes imposed on a primarily agricultural society have caused emotional problems. Nurses are required to be active members of the health and social welfare team as a consequence of attitudinal changes toward health services. Public health nurses, in particular, serve a better educated citizenry. Nurses, of necessity, have become involved in the study of mental health to devise innovative social approaches to mental health care through the provision of community services to the inpatient and outpatient mentally ill. Medical functions delegated to nurses broaden the scope of health services extended by nurses to the community, and cultural backgrounds of the population affect the acceptance of medical services provided by nurses and physicians. The educational framework for health professionals has three major objectives: (1) formulating approaches to deal with individual clients; (2) using knowledge related to health needs of the population; and (3) developing skills required by advances in medical and scientific knowledge. Both nursing education and nursing practice focus on participation of clients and their families in all aspects of family health needs.

HRP-0028457/0 Not Available NTIS
Health Insurance Inst., Washington, DC.
Health and Health Insurance -- The Public's View.
1977, 28p
Available from Health Insurance Institute, 1850 K Street, NW., Washington, DC 20006.

The results of a survey taken to gauge Americans' opinions regarding health, health care, and health care costs are presented. The survey, which was conducted in June 1977 using a sample of 1,501 persons, was intended to be representative of all adults 18 and older living in the continental United States. Ninety-three percent of the respondents felt that they had control over their personal health. Only 6 percent of those surveyed felt that they had little or no control over their health. Methods of improving one's health are noted. The provision of comprehensive health insurance coverage for all Americans is cited as the respondents' first choice for the best method of improving the nation's health. A discussion of health insurance is provided. Sixty-seven percent of those surveyed said the price of health insurance is getting too high for the average family to afford. Fifty-one percent of the respondents felt it is legitimate for health insurance companies to make a profit. Forty-three percent of the individuals surveyed were of the opinion that health insurance through private companies would preserve an individual's freedom of choice in a way that a Government program could not. The majority of those questioned did not believe that a national health insurance program should be delayed until the economy improves.

HRP-0028590/8 Not Available NTIS
National Council of Community Mental Health Centers, Inc., Washington, DC.
Politics of Mental Health Funding -- Two Views.
Allan Beigel. 1977, 2p
Pub. in Hospital and Community Psychiatry v28 n3 p194-195 Mar 77.

The funding of community mental health centers involves a number of political issues which do not lend themselves to simple solutions. Community programs currently must compete with institutions for mental health dollars. At the same time, they are under pressure from accreditation bodies and other quality assurance mechanisms to make costly improvements in physical facilities and service programs. One medical-social issue is the need to more clearly define the services that a commu-

nity mental health center delivers. This could help to alleviate negativism toward coverage of such services by third-party payers. A major issue in the area of peer review and accountability is who will do the review. Revenue-sharing versus categorical funding may turn out to be the most important issue of the immediate future. The fact remains that the major question for the future is the role the Federal Government will play in funding mental health services. Survival of community centers may not depend solely on a balanced budget. It may also require a broadened concept of what centers can and should do.

HRP-0028699/7 PC A07/MF A01
National Institutes of Health, Bethesda, MD.
National Conference on Health Research Principles, October 3 and 4, 1978.
1978, 145p

Principles of health research were addressed at a 1978 conference convened by DHEW. The five panels heard testimony from public witnesses about a draft set of principles developed by health-related agencies within DHEW. Over 1,000 health organizations and professional societies were asked to participate in the development of health research principles related to fundamental research, clinical applications and health services research, health regulation and promotion, research capabilities, and unifying concepts. Draft health research principles presented at the national conference are analyzed. Conference panel reports are included. Budgetary and organizational changes suggested by panel reports and the recommended establishment of a health research council at the Federal level to coordinate agencies involved in health research are noted. The appendixes list the health research principles and panel participants.

HRP-0028753/2 Not Available NTIS
Yale Univ., New Haven, CT. Dept. of Epidemiology and Public Health.
Modeling Prevalence Rates Based on Complex Sample Survey Data.
Daniel H. Freeman. 1977, 11p
Pub. in Jnl. of Chronic Diseases v30 n11 p769-779 1977.

The extension of Grizzle's method for categorical data analysis to biometric models of surveying data is discussed, and various models are applied to data on hypertension derived from the National Center for Health Statistics (NCHS). National estimates based on health indexes are often employed as preliminary estimates in local area surveys of health needs. Another use for these estimates is as baseline data for special-purpose studies. The NCHS health examination survey is one of the largest national surveys ever undertaken. Data from the first cycle, executed October 1959-December 1962, are analyzed for the prevalence of definite hypertension. Several models used to characterize biological processes are linear in their parameters after suitable transformations. The approach of Grizzle is extended to complex sample surveys for which estimates of the sampling variance are obtained. His methodology is combined with the compound function approach of Forthofer and Koch to examine several complex functions in survey estimates of prevalence rates. Three issues are considered: (1) the use of prevalence rates rather than incidence rates; (2) the type of survey data that will permit application of the models; and (3) the suitability of Weibull models and their implications. The estimation of health indexes from survey data means that indexes are inevitably cross-sectional in nature. The usefulness of prevalence rates in establishing national health priorities is discussed, and supporting data are provided.

HRP-0028757/3 Not Available NTIS
California Univ., Riverside.
Health, Investment in Health, and Occupational Choice.
M. L. Cropper. 1977, 22p
Pub. in Jnl. of Political Economy v85 n61 p1273-1294 1977.

Two models of investment in health that recognize the random nature of illness and death are presented. It is assumed that persons invest in health, not to receive monetary return but rather to avoid the disutility associated with being ill. The relation between health capital and illness is viewed as random and not deterministic. A distinction is made between preventive medical expenditures and expenditures in the event of an illness. The first model concerns investment in health capital and encompasses income, the consumption of goods, the life cycle, and investment in health when death is endogenous. The second model relates investment in health to occupational choice. The problem facing individuals in this model relates to trading higher wages for great exposure to pollutants that have deleterious effects on workers' health and increase the probability that they will die at an early age. The way in which exposure to pollution should vary with age is explored with this model. In addition, the way workers should respond to information about occupational hazards is predicted. The important issue in both models is how investment in health and the optimal health stock vary throughout life. Supporting mathematical equations associated with the models are given.

HRP-0028759/9 Not Available NTIS
Estimated Survival Probability Index of Trauma Severity.
Paul S. Levy, Ross Mullner, Jack Goldberg, and Henry Gelfand. 1978, 8p
Pub. in Health Services Research v13 n1 p28-35 Spring 1978.

An index of survival rates associated with injury codes specified in the International Classification of Diseases, Adapted (ICDA) was constructed using data from the 1973 Hospital Discharge Survey (HDS). Data in the HDS were abstracted from face sheets of the medical records of discharged patients. Information items included age, sex, race, marital status, discharge status (alive or dead), and length of stay. Up to five listed diagnoses and up to three surgical procedures were abstracted. These data were coded according to the ICDA and divided into two groups. The source group consisted of 18,596 records from hospitals in the northeast, north-central and western regions of the country. The test group, used to validate the index of survival rates, involved 8,290 records from the southern region. Discharge records of the source group were scanned, and 15,117 records were utilized that reported only 1 trauma condition to construct the index. An estimated single-condition survival rate was calculated for each integer ICDA code. The estimated survival probability index for a particular hospitalized patient was calculated with the single-condition survival rate. In the process of validation with the test group, a comparison was made of estimated and predicted death rates among the various strata. Of 187 integer ICDA codes from 800 to 999, 167 appeared as single-trauma conditions in the source group and 92 appeared on 20 or more records. The estimated survival probability index, based on its reliability and validity, is proposed as a tool for evaluating the severity of injuries of hospitalized patients. Supporting data are provided.

HRP-0028760/7 Not Available NTIS
Disease and Rural Development -- A Sociological Analysis of Morbidity in Two Mexican Villages.
Asa Cristina Laurell, Jose Blanco Gil, Teresa Machetto, Juan Palomo, and Claudia Perez Rulfo. 1977, 23p
Pub. in International Jnl. of Health Services v7 n3 p401-423 1977.

A comparative study of two rural villages in Mexico was undertaken to assess the impact of the rural development process on morbidity, and the influence of socioeconomic conditions on the distribution of disease in the population. Key elements in the analysis of the rural development process, as related to health and disease, were the amount and quality of available land, the control exercised over land and types of crops, the extent of wage labor, and the terms and the degree of importance of commercial exchanges. It was hypothesized that socioeconomic and cultural characteristics, such as types of productive activities, economic surplus, transfer mechanisms, migratory status, family organization, and nutritional habits would have a greater influence on morbidity than environmental characteristics (housing, water quality, sanitary installations, and medical care resources). Two questionnaires were utilized in data collection: a socioeconomic questionnaire administered to the household or family and a morbidity schedule administered to the individual. Morbidity was significantly higher in the more developed village than in the village characterized by a predominantly subsistence economy. Socioeconomic characteristics defined groups of high and low morbidity more clearly than sanitary conditions and access to professional medical care. Supporting data are tabulated. The questionnaires are not included.

HRP-0028786/8 Not Available NTIS
Northwestern Memorial Hospital, Chicago, IL.
Application of Cost-Benefit Analysis to Clinical Nursing Practice -- A Comparison of Individual and Group Preoperative Teaching.
Mary Crabtree. 1978, 6p
Pub. in Jnl. of Nursing Administration v8 n12 p11-16 Dec 78.

The use of cost analysis for assessing the benefits of individual versus group preoperative training of patients is illustrated. The analytic technique requires definition of the problem and of alternative solutions, measurement and weighing of alternative consequences, and choice of alternatives. Cost benefit analysis involves either quantification of outputs and per unit cost calculation or estimation of costs for each alternative, and a decision on whether benefits are worth costs; the second approach is best suited to a system where not everything can be reduced to monetary terms. For cost-effectiveness calculation benefits are weighted according to importance and outcome standards must be established. In analyzing cost benefits of alternative techniques for preoperative teaching of patients, costs of nurses' and transporters' time, of using the classroom, and of equipment depreciation are calculated; benefits are evaluated in terms of patients' postoperative ventilatory function, incidence of respiratory complications, and length of hospital stay. Findings indicate that group teaching is less cost-effective than individual teaching in this case, largely because of transportation, but that the quality benefits achieved make group teaching the most attractive alternative. One table and one figure are supplied.

HRP-0028798/7 Not Available NTIS
Pittsburgh Univ., PA. Graduate School of Public Health.
Nursing Administration's Participation in Risk Management.
Nathan Hershey, and Mary Jane Bowes. 1978, 4p
Pub. in Jnl. of Nursing Administration v8 n12 p33-36 Dec 78.

Steps taken by nursing administration in individual institutions to deal with incidents and conditions leading to malpractice claims are discussed. Rising claim costs are due to service volume, a litigious public, legal developments, and inflation, as well as to patients' often justified belief that they have sustained harm. To minimize risk, nursing administration must identify risk sources, such as new laboratory procedures. These risks can be reduced through such measures as the appointment of a decisionmaking team for risk management, review of the patient report and notation system used, and establishment of standard practices with respect to treatment, and through instructional programs for nurses and physicians. A system should be developed for incident reporting and review, followed by data analysis and recommendations of the risk management team. Furthermore, efforts should be made to assure that new notation techniques and corrective practices are properly adopted and that educational programs are effective. A short bibliography is supplied.

HRP-0028862/1 Not Available NTIS
Rochester Univ., NY. School of Nursing.
Overcoming Barriers to the Employment and Utilization of the Nurse Practitioner.
Judith A. Sullivan, Christy Z. Dachelet, Harry A. Sultz, Marie Henry, and Harriet D. Carrol. 1978, 7p
Pub. in American Jnl. of Public Health v68 n11 p1097-1103 Nov 78.

Five obstacles which are preventing the integration of nurse practitioners (NP's) into the existing health care system and strategies for overcoming these obstacles are discussed. The obstacles are: 1) psychological factors; 2) patients' and provid-

ers' attitudes towards the role of the NP; 3) confusion about the NP's legal status; 4) organizational aspects of the system of health care and structural aspects of the practice setting; and 5) the lack of a consistent policy to govern the reimbursement of the NF for services provided. The results of questionnaires sent to NP's and their employers are noted. It was found that fewer barriers to the role development of NP's in the practice setting were perceived by employers than by NP's. A description of the variables examined in the study is provided. Seven of the 15 specific barriers that were identified by NP's and employers were related to the physical structure or organization of the practice setting. It is suggested that before the NP is fully incorporated into the system, more clerical assistance, additional office space, more examining rooms and more equipment will be required. Predictions as to what the future will hold for the NP are offered. Tables highlight the data.

HRP-0028906/6 Not Available NTIS
American Hospital Association, Chicago, IL.
Emergency Department Key Factor in Hospital Admissions.
Marian S. Kessler, and Karen C. Wilson. 1978, 4p
Pub. in Hospitals, Jnl. of the American Hospital Association v52 n24 p87ff 16 Dec 78.

A discussion is provided of the resources required for a hospital's emergency department to successfully handle its patients. Hospital planners, intermediaries, and managers must be able to reliably measure emergency department activity since emergency patients generally remain in the hospital longer than other patients and because they require a greater use of ancillary services. The results are presented of a survey conducted by the American Hospital Association to determine the involvement of community hospitals in ambulatory care activities. Of the 2,486 hospitals that responded, most estimated that of their total admissions, between 16 and 30 percent originated in the emergency department. Sixty of the hospitals surveyed said that more than half of their admissions were emergency admissions. The relationship of the emergency department staffing pattern to the anticipated volume of activity is considered. The relevancy of hospital ownership to the level of emergency admissions is explored. Tables highlight the data presented.

HRP-0029024/7 Not Available NTIS
Cultural and Other Barriers in the Implementation of Health Programs.
Cicely D. Williams. 1978, 3p
Pub. in the American Jnl. of Clinical Nutrition v31 n11 p2037-2039 Nov 78.

Failure to improve health and medical services in underdeveloped areas is considered. Mass efforts to reduce the incidence of disease and increase survival and longevity are not ultimate solutions to the improvement of health and medical services. Rather, such programs should be used only in emergencies. Factors that adversely affect the implementation of health programs are inadequate education and finance, underdevelopment of agriculture and industry, prejudice, traditions, religious convictions, and habits. It is emphasized that more attention must be given to methods employed to promote health in third-world countries. Reasons why health and medical services have not improved in less developed areas are failure to diagnose causes of ill health, failure to examine preexisting medical and health services, failure to improve statistics and their analysis, failure to examine and appreciate functions of preventive and curative medicine, failure to provide continuity of care (homes, health centers, and hospitals), failure to visit in homes and thus appreciate advantages and limitations of the mini-environment, and failure to train staff and supervise them. Rather than a focus on a generic model of health, more consideration must be given to defining local needs, resources, and attitudes.

HRP-0029038/7 Not Available NTIS
Mount Sinai School of Medicine, New York.
Remote Pediatric Consultation in the Inner City -- Television or Telephone.
Emily Glazer, Carter Marsnall, and Nicholas Cunningham. 1978, 3p
Pub. in American Jnl. of Public Health v68 n11 p1133-1135 Nov 78.

The results of a study undertaken to compare the utilization of telephone and bidirectional television by pediatric nurse practitioners (PNP's) who worked in a primary care clinic in East Harlem are presented. The study began 4 months before the telephone system was installed and continued 8 months after. In the initial 4-month period, only the television was available. From March 1974 through February 1975, 21 percent of the visits to the clinic resulted in consultations, 285 of those being television consultations. Of the 285, 189 occurred in the 8 months when both telephone and television were available. After the telephones were installed, the rate of television consultation decreased from 23.3 percent to 10.8 percent. If the consultations dealt primarily with therapeutics, PNP's considered the telephone a suitable substitute for the television. Television was preferred for consultations dealing with diagnosis and overall patient management. The reasons for the preference for television in these areas are considered. Tables highlight the study data.

HRP-0029091/6 Not Available NTIS
Consumer Commission on the Accreditation of Health Services, Inc., New York.
National Health Service I. (Health Perspectives v4 n1).
May 77, 6p
See also NHS-II -- V, HRP-0029092 -- HRP-0029095.
Available from Consumer Commission on the Accreditation of Health Services, Inc., 381 Park Ave. S., New York, NY 10016.

This article proposes a national health service (NHS) in the United States. Reasons why the existing health care system has failed are cited. They concern fee-for-service reimbursement, reimbursement systems that encourage unnecessary procedures, the failure of the Government to develop effective controls over the supply and distribution of services, a lack of accountability in institutional expenditures, the lack of coordination between cost reimbursement and health planning, political influences, reliance on peer quality review, inadequate quality of care standards, financial and geographic barriers to health care, a lack of consumer health education, and the exclusion of consumers from the decisionmaking process. As envisioned by the Consumer Commission on the Accreditation of Health Services, Inc., an NHS would: create a nationwide mechanism for financing the reorganization of health and medical services, place providers of care under public control, establish realizable health goals, place services in areas of greatest need, establish and implement a coordinated health plan based on regional needs, provide equal access, permit service evaluation, eliminate unneeded and duplicative services, expedite shared services, improve services and control costs, involve consumers in the decisionmaking process, establish health care as a right, and replace the dominance of providers' interests with societal goals. Steps in the transition are outlined.

HRP-0029092/4 Not Available NTIS
Consumer Commission on the Accreditation of Health Services, Inc., New York.
National Health Service II. (Health Perspectives v4 n2).
Jun 77, 8p
See also NHS-I, HRP-0029091, NHS-III -- V, HRP-0029093 -- HRP-0029095.
Available from Consumer Commission on the Accreditation of Health Services, Inc., 381 Park Ave. S., New York, NY 10016.

The selection of providers in a national health service (NHS) program for the United States is considered. The policy advocated by the private health care sector of no Government interference has been institutionalized in Federal legislation. Title XVIII (Medicare) of the Social Security Act prohibits Federal involvement in the private practice of medicine. The development of an NHS means that health care providers must be selected according to the population's needs. An explicit contractual relationship between the Government and providers must be established in an NHS and any transitional program. Approximately 200 health systems agencies (HSA's) have been established under the National Health Planning and Resources Development Act of 1974. These agencies constitute an organizational framework for the review and selection of needed providers. HSA's are charged with developing regional health systems plans; and the unecessary expansion or development of institutions is a major concern. Public ownership of hospitals or control of their governing bodies is required in order for the Government to be able to use hospitals to implement national and regional policies and become responsive to community needs. Consideration must be given to the role of State regulation, standards, nursing home regulation, hospital assessment, hospital termination, and the principle of due process in the implementation of an NHS.

HRP-0029093/2 Not Available NTIS
Consumer Commission on the Accreditation of Health Services, Inc., New York.
National Health Service III. (Health Perspectives v4 n3).
Oct 77, 8p
See also NHS-I -- II, HRP-0029091 -- HRP-0029092, NHS-IV -- V, HRP-0029094 -- HRP-0029095.
Available from Consumer Commission on the Accreditation of Health Services, Inc., 381 Park Ave. S., New York, NY 10016.

Regionalization and education are issues in the implementation of a national health service (NHS) in the United States. Regionalization demands systematic organization, a focus on the population's needs, and ownership and control of the health system by the Government, representing and assisted by citizens. A regionalized health care system economically integrates preventive, ambulatory, emergency, inpatient, home, and long-term care and related supporting services. The development of a network of interrelated health facilities delivering primary, secondary, and tertiary levels of care is basic to the concept of regionalization. Benefits resulting from regionalization through an NHS can be realized by establishing a well-defined relationship among these levels of care in terms of referral patterns, the organized flow of patient data, special consultant services, and the rotation of providers through the health care system to assure proper continuing education and communication. Health-related legislation is reviewed, including the Hospital Survey and Construction Act; the Heart Disease, Cancer, and Stroke amendments authorizing the establishment of regional medical programs; the Comprehensive Health Planning Act; and the National Health Planning and Resources Development Act of 1974. National health insurance plans in England and Sweden are examined.

HRP-0029094/0 Not Available NTIS
Consumer Commission on the Accreditation of Health Services, Inc., New York.
National Health Service IV -- The Physician's Role. (Consumer Health Perspectives v5 n1).
Apr 78, 8p
See also National Health Service I-III, HRP-0029091 -- HRP-0029093, Volume V, HRP-0029095.
Available from Consumer Commission on the Accreditation of Health Services, Inc., 377 Park Ave. S., New York, NY 10016.

The institution of a national health service (NHS) in the United States is examined in relation to the role of physicians in primary care, secondary care, tertiary care, continuing education, funding, and quality and accountability. Many conditions necessary for the transition to an NHS exist in contemporary society, e.g., the trend toward regional planning, Government support of medical education, increased coordination of graduate residency training with medical schools, and Government purchase of health services. The advantage to consumers of receiving a physician's care through an NHS is the ability to receive treatment when needed, irrespective of economic status or residence. An NHS has positive implications in terms of preventive medicine and early intervention. Standards and ways of identifying physicians by their level of education and skills are needed to place them within a regionalized system. Each level of care (primary, secondary, and tertiary) requires different types of knowledge and skills. Continuing education is essential for physicians. Only Maryland and New

Mexico have requirements for the periodic recertification of physicians. Paying physicians by salary in an NHS, along with other workers in the health care system, has both direct and indirect advantages over the fee-for-service payment system. With its emphasis on education, an NHS will bring physicians out of private offices and into the view of the public, thus improving quality and accountability.

HRP-0029095/7 Not Available NTIS
Consumer Commission on the Accreditation of Health Services, Inc., New York.
National Health Service V -- Building a Medical Staff. (Consumer Health Perspectives v5 n3).
Aug 78, 8p
See also National Health Service I-IV, HRP-0029091 -- HRP-0029094.
Available from Consumer Commission on the Accreditation of Health Services, Inc., 377 Park Ave. S., New York, NY 10016.

The integration of medical staff into a national health service (NHS) program for the United States is discussed. An NHS, as proposed by the Consumer Commission on the Accreditation of Health Services, Inc., would consist of a regionally organized three-tiered institutional system staffed by salaried health personnel, including full-time physicians. Health centers located in neighborhoods and work settings would be the operating environment for physicians. Other facilities would be community hospitals for routine inpatient (secondary) care and regional medical centers for specialty (tertiary) procedures and/or hospitalization. The number of physicians that would be needed under NHS would be based on several factors, including the number of health needs perceived by society, the extent to which ancillary medical personnel are engaged in the direct delivery of health services, the health status and demographic characteristics of the population, and the geography of the country. Of all U.S. physicians, approximately 83 percent limit their practice to specialties. The anticipated increase in the number of physicians will be advantageous for organizing an NHS, since surplus makes change easier. A 10-year phase-in of an NHS is suggested to allow for major changes in the structure of the existing delivery system to be made. These changes involve teaching institutions and students, interns and residents, and practicing physicians. Data on the application of physician ratios in organized health care systems to the State of Massachusetts are tabulated.

HRP-0029212/8 Not Available NTIS
American Nurses' Association, New York Div. on Maternal and Child Health Nursing Practice.
Standards of Pediatric Oncology Nursing Practice.
1978, 7p
Available from American Nurses' Association, 2420 Pershing Road, Kansas City, MO 64108.

The purpose of this document is to present standards of pediatric oncology nursing practice which were approved in August 1978 by the board of directors of the Association of Pediatric Oncology Nursing and by the executive committee of the Division on Maternal and Child Health Nursing Practice of the American Nurses' Association Pediatric oncology nursing practice, which serves children with cancer and their families, and focuses on the restoration, maintenance, and promotion of optimal health status and on an acceptable quality of life for the children and their families. The seven standards presented, each of which is accompanied by a series of assessment factors, pertain to collection and recording of data about the health and illness state of the child and family; nursing diagnosis; the plan for nursing care; reassessment of the child and the family; and reconsideration of nursing diagnoses, setting of new goals, and revision of the plan for nursing care. Recognition is given to the fact that ongoing revisions of the standards will be necessary to reflect the enlarging scope of practice and the increasingly sharper delineation of the theoretical basis of the practice.

HRP-0029253/2 Not Available NTIS
Ministry of Health and Welfare, Tokyo (Japan).
Health and Welfare Services in Japan.
1977, 170p
Available from International Affairs Division, Minister's Secretariat, Ministry of Health and Welfare, Tokyo, Japan.

Health and welfare services in Japan developed in recent years by the Ministry of Health and Welfare to meet expanding health care demands are outlined in detail. Health maintenance and health promotion services relate to disease control, the medical service system, medical care insurance, and pharmaceutical affairs. Improvement of the living environment extends to the development of water supply facilities, waste management, food sanitation and measures to assure food and product safety, and sanitary control of the living environment, i.e., buildings and household products. Income security is assured by pension schemes and a pension reserve fund, public assistance, and a children's allowance scheme. Social welfare is promoted through family and child welfare, welfare for the mentally and physically handicapped and for the aged, and aid for war victims through welfare offices, voluntary welfare service, the Consumers' Cooperative Association, programs for marginal income families, and other welfare programs. The Ministry supports an international exchange program and an information and data processing system. Twenty figures, 99 tables, and 6 appendixes with data tables on health status are supplied.

HRP-0029254/0 Not Available NTIS
Ministry of Health and Welfare, Tokyo (Japan).
Guide to Health and Welfare Services in Japan.
1977, 57p
Available from International Affairs Division, Minister's Secretariat, Ministry of Health and Welfare, Tokyo, Japan.

Statistics on health and welfare services in Japan are presented. The national Government agency with the mission of promoting health is the Ministry of Health and Welfare, Koseisho, which is responsible for health and medical service, social insurance, and information gathering and analysis for policy purposes. Ministry functions, summarized in tables, charts, and graphs, relate to statistical investigation (population and household, vital statistics, life expectancy, and disease prevalence); national and health budgets; public health and disease management; environmental health; water supply and environmental sanitation; medical care facilities and dental health; pharmaceutical affairs, including drugs, blood collection, narcotics control, and pharmacists; social welfare service; various forms of welfare for children and families; social insurance (medical care, pensions, labor accident compensation, and employment insurance); and aid for war victims. An appendix provides an organizational chart of the Ministry of Health and Welfare.

HRP-0029526/1 Not Available NTIS
National Research Council, Washington, DC. Committee on a Study of National Needs for Biomedical and Behavioral Research Personnel.
Personnel Needs and Training for Biomedical and Behavioral Research.
1978, 368p
Contract N01-OD-5-2109
Available from Commission on Human Resources, National Research Council, 2101 Constitution Ave., N.W., Washington, DC 20418.

The fourth annual report on national needs for biomedical and behavioral research personnel is presented in keeping with requirements of the 1974 National Research Service Award Act. A variety of activities have been undertaken to analyze the development of Federal support programs, links between health-related training and employment, areas of training need, involvement of women and minority scientists, and administrative problems in training. These include surveys, site visits, data review, statistical model development, conference sponsorship, and study monitoring. Following an overview and a review of current activities, training issues and program recommendations are outlined for the biomedical sciences, the behavioral sciences, the clinical sciences, health services research, and nursing research. Special contributions of the report include results of a survey of biomedical and behavioral science department chairmen at PhD-granting institutions, changes in models for projecting graduate-level faculty needs, discussion of special dentist and veterinarian demands, work analysis of nonclinical behavioral scientists, identification of specialty fields requiring special attention, and results of on-site interviews with nursing faculty in potential PhD programs. A glossary, tables, a bibliography, and nine appendixes are furnished.

HRP-0029533/7 Not Available NTIS
Fogarty International Center, Bethesda, MD.
Priorities for the Use of Resources in Medicine.
1977, 351p
Conference held at National Institutes of Health, Bethesda, MD, Nov 17-19, 1976.
Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock No. 017-053-00063 9.

Proceedings of a joint conference by Britain and the United States on establishing priorities for the allocation of health resources to contain costs are reported. Participants are noted health educators and Government health officials from Britain, the United States, and Europe. Presentations relate to perspectives on American health; comparison of the development of the American and British systems; radical alternatives for medical practice; health status indexes as evaluation criteria; alternative approaches to use of medical care resources in the United States; effects of health services on adult male mortality in relation to the effects of social and economic factors; the relationship between the hospital, the family practitioner, and the community; the future physician; selection, training, and autonomy of the future nurse; delegation of physicians' responsibilities; health planning and political decisionmaking in the United States and Britain; future trends in health research; effects of the health profession on cost-containment; and political uncertainties and the need for priorities. Establishment of a data system, cultivation of public understanding, redirection of health science education, extension of science further into medical practice, and establishment of a national resource allocation system are recommended. Twelve separate bibliographies, 17 figures, and 35 tables are furnished.

HRP-0029568/3 PC **A06**/MF **A01**
National Center for Health Statistics, Hyattsville, MD.
Facts at Your Fingertips -- A Guide to Sources of Statistical Information on Major Health Topics. Third Edition.
1978, 125p PHS-79-1246

This book is a compilation of sources of statistical information on major health topics. Under each topic, information on National Center for Health Statistics publications or data appears first. Other DHEW sources, other Federal agencies, and private organizations or associations are then cited. Among the health topics covered are: abortions, absenteeism, accidents, adolescents' health, adoption, aging, alcohol and alcoholism, allergies, arthritis, birth defects, the health characteristics of blacks, burns, cancer, cerebral palsy, hospital and nursing home charges, child abuse, children's health, cigarette smoking, communicable diseases, dental health, diabetes, divorce, and drug abuse. Other concerns dealt with are epilepsy, family planning, hearing, heart attacks, heart disease, hospitalization, Huntington's Disease, hypertension, hypoglycemia, illegitimacy, the Indian population, infant mortality, sports injuries, kidney dialysis, marriage, maternal mortality, mental health, mental retardation, mortality, multiple sclerosis, muscular dystrophy, neurological diseases, obesity, occupational health, poisoning, sickle-cell anemia, sudden infant death syndrome, suicide, transplants, venereal disease, visual disorders, and wife abuse. A guide to ADVANCEDATA is also included.

HRP-0029617/8 PC **A05**/MF **A01**
Northeastern Univ., Boston, MA. Center for Medical Manpower Studies.
Employment Prospects for Middle Echelon Health Care Administrators and Their Educational Implications.
Harold M. Goldstein, Gustav Schachter, and Robert Hankin. Dec 76, 81p

Citing a growing demand for properly trained mid-level health care administrators, this paper focuses on supply, demand, and educational factors. A more specific regional focus is the Boston-Cambridge area of Massachusetts through a survey of this area covering the years 1968-1973. Three

major types of employers for mid-level administrators are identified: hospitals, nursing and rest homes, and ambulatory facilities. Factors pointing to growing manpower demand are described -- technological development; emphasis on new delivery modes, e.g., neighborhood health centers; and the implications of proposed national health insurance. Various occupational categories are proposed, as well as occupation/tasks matrices, and a survey of relevant course requirements for each job category. Several full-time undergraduate programs in health administration are described, including those in Quinnipeac and the University of New Hampshire. Other major topics include current inadequacies in the training of administrators and the range of potential employers of administrators. Tables and an appendix are provided.

HRP-0029619/4 PC **A03**/MF **A01**
Northeastern Univ., Boston, MA. Center for Medical Manpower Studies.
Patterns of Health Care Delivery in New England.
Gustav Schachter, and Harold M. Goldstein. 1977, 27p
Delivered at Northeast Regional Science Association Meeting, Halifax, May 29, 1977.

Based upon a survey of hospitals in the Boston-Cambridge area of Massachusetts, this paper focuses on regional variations in demand for health manpower, manpower distribution problems, and projections of future demand. Statistics and examples are drawn solely from the New England region, and more specifically, from Massachusetts. Income and education of a population are shown to be inversely correlated to hospital admissions. Boston-Cambridge statistics for the period 1968-1973 show a 31.4 percent increase in outpatient visits and a 25.2 percent increase in the level of employment in health facilities (as compared to 56 percent, and slightly less than 25 percent for the nation). In New England, only the number of hospital beds appears to be a determining factor in hospital inpatient admissions. Other important variables since 1954, both in New England and the Nation, include the number of active physicians per bed and hospital occupancy rates and average daily census. Massachusetts is cited as an example of supply (e.g., the number of physicians) increasing demand (hospital admissions). Location and structural distribution problems are discussed, including the high concentration of physicians in the urban Boston area. Projections of demand for physicians range from a 14.4 percent increase (under the least comprehensive version of proposed national health insurance) to 34.3 percent (under the most comprehensive version). A number of tables are included.

HRP-0029684/8 Not Available NTIS
Saint Louis Univ., MO. Dept. of Community Medicine.
Community Medicine -- Some New Perspectives.
Rodney M. Coe, and Max Pepper. 1978, 247p
Available from McGraw-Hill Book Co., 1221 Ave. of the Americas, New York, NY 10020.

The basic concepts and issues of community medicine are explored in a textbook prepared by a sociologist and a physician. These concepts and issues are then used to analyze the contemporary health delivery system. The principles and development of community medicine are examined first. This discussion is followed by material concerned with the nature of community settings and measurement of community processes. Issues in the delivery of comprehensive services -- organization of services, health manpower, the role of the consumer, the environment, and ethical issues -- are then considered. Finally, illustrations of the practice of community medicine are provided. Attention is given to the organization of community groups around significant issues, examples of the way health care delivery problems can be dealt with using the problemsolving method, community health services, evaluation, the role of medical education, and community medicine outside the United States.

HRP-0030075/6 Not Available NTIS
Colorado Univ. Medical Center, Denver. School of Nursing.
Current Perspectives in Nursing Management. Volume I.
Ann Marriner. 1979, 214p
Available from C. V. Mosby Co., 11830 Westline Industrial Dr., St. Louis, MO 63141.

This volume contains 17 essays which together provide the information a beginning middle manager needs to know. The theme of the book is working with others for the management of patient care. The subjects covered include the development of leadership and management thought, teams and their use in health services, and the cultural diversity of nurses and their clients. In addition, the essays touch on planning and directing care, evaluation of staff performance, team nursing, and primary care. Other topics considered are planned change, designed to deal with nursing's problems through the application of the behavioral sciences, effective communication with colleagues and clients, the nurse's teaching function, continuing education, research, political dynamics, and the legal aspects of nursing. Finally, the socialization process as it relates to the new graduate and the job procurement procedure are considered. Lists of suggested readings accompany the text.

HRP-0030076/4 Not Available NTIS
Mount Sinai Medical Center, New York. School of Continuing Education in Nursing.
Current Perspectives in Rehabilitation Nursing. Volume I.
Rosemary Murray, and Jean C. Kijek. 1979, 232p
Available from C. V. Mosby Co., 11830 Westline Industrial Dr., St. Louis, MO 63141.

This book focuses on selected aspects of rehabilitative nursing. It contains 21 essays which together deal with current ways of viewing and resolving health problems. These presentations have been divided into three parts. The first is concerned with perspectives in rehabilitation nursing across the spectrum of nursing roles. The nursing role is discussed in terms of identifying a philosophy of care, specialization of care, management of nursing practice, nursing research and education, and leadership. The second part, which is concerned with therapy, deals specifically with such problems as acute spinal cord injury, the intensive care unit, preventing and treating the pressure ulcer, cardiovascular disease, the role of the staff nurse as client educator, and biofeedback. Material in the final section is concerned with the rehabilitation team. Among the subjects addressed are sexual therapy, physical therapy, and the professional and clinical contributions of psychology to the rehabilitation process. The theme of the volume as a whole is holistic and humanistic health care. Illustrations are included.

HRP-0201001/5 PC **A08**/MF **A01**
Purdue Univ., Lafayette, IN. Health Services Research and Training Program.
A Guide to the Development of Health Resource Inventories.
Health planning information series,
Anthony Oreglia, Denise A. Klein, Lee A. Crandall, and Paul Duncan. Oct 78, 171p
DHEW/PUB/HRA-79/14002, NHPIC/HPIS-10
Contracts PHS-HRA-230-75-0061, PHS-HRA-282-78-0099
Supersedes PB-294 010.

The development of inventories of health care resources is a basic planning activity involving data. Other data collection depends upon their inclusiveness and accuracy. In 1976 Purdue University's Health Services Research and Training Program prepared a guide to assist health planners in developing inventories of various types. This earlier guide grew out of research on requirements for health resources information, data sources, and procedures for compiling inventories. Subsequent research at Purdue dealt with methods for collecting, analyzing, and using primary and secondary data on health needs, resources, and utilization. The results of this research were published by this Bureau in 1977 in two volumes entitled 'A Data Acquisition and Analysis Handbook for Health Planners.' Because of the many changes that have occurred since 1976 in the addresses, telephone numbers, prices of the documents, and data presented in these documents, the Bureau commissioned an update of the earlier work. The information presented in this guide is based upon an examination of the publications cited and upon extensive telephone conversations with publishers, Federal agency staff, and staff of other health-related organizations.

HRP-0301301/8 PC **A03**/MF **A01**
Bureau of Health Planning, Hyattsville, MD.
Planning for Outpatient Surgery Services -- An Annotated Bibliography.
Mar 79, 27p HRA-79-14005, BHP/HPBS-13

The citations in this bibliography pertain to the organization and use of outpatient surgery facilities and services. It has been found that the development and use of such services are instrumental in controlling health care costs. The intended users of the publication are health planners, who need to be aware of trends in the provision of services, particularly trends in methods of providing health services which may reduce costs. Others who may find it of value are health providers, consumers, professional organizations, and State and local officials charged with developing comprehensive health service systems. The bibliography includes references to literature published in the United States since January 1973. The material was identified from literature searches of the data bases of the National Health Planning Information Center and the National Library of Medicine. These references are organized alphabetically by author. A personal author index follows the text.

HRP-0900610/7 Not Available NTIS
Western Interstate Commission for Higher Education, Boulder, CO. Western Council on Higher Education for Nursing.
Instruments for Measuring Nursing Practice and Other Health Care Variables. Volumes I, II.
Mary Jane Ward, and Carol Ann Lindeman. 1978, 832p DHEW/PUB/HRA-78/53
Volumes bound separately.
Available from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock No. 017-022-00628-6.

This two-volume publication is the result of a project to develop a compilation of data-gathering devices for measuring nursing practice and other health care variables. It includes descriptions and critiques of 140 psychosocial instruments and reproductions of 135 of them. Descriptions of 19 instruments that can be employed to measure physiological variables of interest to nurses and other health care personnel are also provided. In volume I are descriptions, critiques, and copies of the psychosocial instruments. The format for each encompasses the title, author, variable, instrument description (nature and content, administration and scoring), instrument development (rationale, source of items, development procedure, reliability, and validity), use in research, comments, references, source of information, and copyright information. The instruments have been grouped into provider and client categories, including health care provider affective variables, client cognitive variables, client affective variables (general, anxiety and depression, self-concept, psychological health status), client physical health status, and client biopsychosocial health status (general and sociobiological functioning). The descriptions of instruments to measure physiological variables are presented in volume 2. Included are annotated bibliographies for each of the two major sections.

HRP-0900611/5 Not Available NTIS
Western Interstate Commission for Higher Education, Boulder, CO.
Instruments for Use in Nursing Education Research.
Mary Jane Ward, and Mark E. Fetler. Jan 79, 846p
Available from Western Interstate Commission for Higher Education, P.O. Drawer P, Boulder, CO 80302.

This volume is the product of an effort undertaken by the Western Interstate Commission for Higher Education in 1974 and completed in 1977, with subsequent expansion of the effort. Sources were professional periodicals in the fields of nursing, education, psychology, and sociology; computerized literature searches; newsletters of nursing and professional organizations; lists of master's theses; and government and nonprofit organizations' announcements of grants and contracts

awarded. An attempt was made to locate users of instruments in nursing education research. Criteria for inclusion in the resource volume were the past use of the instrument in nursing education research, inclusion of information required to complete the description section, pertinence to nursing research, and lack of other critiques of descriptions available. The format for the description and critique of each instrument contains key concepts, title, author, variables, description, and development (rationale, source of items, procedure, reliability, and validity). Suggestions for instrument development and use are offered. A total of 118 instruments are included. A glossary, an author index, and a key concepts index are provided. Appendixes contain an annotated bibliography of compilations of research instruments, letters to users of instruments, and a list of persons who have used the instruments.

HRP-0901305/3 Not Available NTIS
International Development Research Centre, Ottawa (Ontario).
Low-Cost Rural Health Care and Health Manpower Training -- An Annotated Bibliography With Special Emphasis on Developing Countries. Volume 3.
Frances M. Delaney. 1977, 187p
See also Volume 1, HRP-0007732, Volume 2, HRP-0016801.
Available from International Development Research Centre, P.O. Box 8500, Ottawa, Canada K1G 3H9.

This annotated bibliography provides information concerning the planning, financing, and organization of low-cost health care systems. Material pertaining to the relationship of low-cost health care systems to other community services and organizations is included, as is information on the types and functions of different health care personnel and the effect of health services on social and economic indices. Articles are grouped under five headings: reference works; primary care -- implementation; organization and planning; primary health manpower -- training and utilization; and formal evaluative studies. The articles in each category are arranged in alphabetical order according to the name of the author, editor, or compiler. Abbreviations and acronyms are listed. An author index, a subject index, and a geographical index are included. The information presented is intended to be used by representatives of health ministries, academic and research institutions, and medical institutions. Photographs are included.

HRP-0901319/4 PC **A03**/MF **A01**
Innovative Programming Systems, Inc., Minneapolis, MN.
Development and Validation of Chairside Assisting Skills Evaluation (CASE) Materials.
Final rept.
May 78, 39p
Contract PHS-HRA-231-76-0031

The results of a project designed to develop and validate methods for measuring the chairside assisting skills of individuals studying to be dental assistants, to determine the strengths and weaknesses of those students in chairside assisting, and to offer direction for additional instruction are presented. To be an effective dental assistant, the student must learn the procedures as they are used in the dental office. Evaluation instruments were developed for use in the clinical and institutional setting. Descriptions of the five phases of the Chairside Assisting Skills Evaluation (CASE) materials are provided. The phases are: identifying the content to be included; developing objectives, analyzing tasks and measuring criteria; developing evaluation instruments and a validation plan; testing; and analyzing data, revising, and developing camera-ready materials. Data are given in tabular form. Questions as to the practicality of the CASE materials are addressed. The appendixes include a list of materials reviewed, institutional objectives, clinical objectives, and related materials.

HRP-0901340/0 PC **A02**/MF **A01**
Chi Systems, Inc., Ann Arbor, MI.
State, HSA, and Institutional Planning Procedures Manuals.
Executive summary.
Jun 78, 17p
See also Institutional Manual, HRP-0901343, HSA Manual, HRP-0901342, State Manual, HRP-0901341.

A summary is provided of three planning manuals prepared by DHEW in 1975. The manuals describe the procedures and methods of health services planning that are required before decisions can be made about health resources, including facilities. The material is intended for use by DHEW staff, State health planning and development agencies, health systems agencies, institutional providers, health planners, and consumers. A description is presented of the development of a generic process for health services planning. The planning activities are grouped and titled and placed in a linear sequence. The vertical interactions between levels are revealed in a chart. A discussion of the service area characteristics, including the demographic and socioeconomic characteristics of a population and the physical characteristics of the area where they live, is provided. The method for estimating future requirements for health care services is explained. The matching of the inventory of service equivalent needs and the inventory of existing capacity is explored. Figures illustrate the information presented.

HRP-0901399/6 PC **A08**/MF **A01**
American Association for Respiratory Therapy, Dallas, TX.
Study to Compare Performances of Respiratory Therapy Practitioners on Written and Oral Examinations to Performance Appraisals in the Live, Clinical Setting. Subproject II.
Aug 78, 167p
Contract PHS-HRA-231-75-0213
See also Subproject I, HRP-0901398, Subproject III, HRP-0901397, Subprojects IV-VI, HRP-0901400 -- HRP-0901402.

The efficacy of various written and oral examinations administered to a group of respiratory therapist practitioners was compared with the results of therapist evaluation based on clinical performance. The American Association for Respiratory Therapy received funds to conduct an external validation of proficiency examinations developed by the Psychological Corporation. Two levels of these examinations were administered in conjunction with national certification and registry examinations. Six objectives were realized in the course of the project: (1) creation of a domain-referenced test specification for practitioner performance (role delineation); (2) generation of two 25-item test forms to accompany the test specification and field tested in the clinical comparison study; (3) full documentation of the process by which domain-referenced tests were developed; (4) statistical determination of the reliability of on-the-job clinical evaluation tools and procedures; (5) determination of the relationship between measures employed to credential respiratory therapy personnel and those being considered for use; and (6) determination of the relationship between a practitioner's clinical performance and performance on written and oral measures intended for credentialing purposes. Appendixes contain the domain specification on the appropriateness of respiratory care and two domain-referenced test forms.

LA-7254-PR PC **A10**/MF **A01**
Los Alamos Scientific Lab., NM.
Biomedical and Environmental Research Program of the LASL Health Division. Progress Report, January--December 1977.
D. F. Petersen, and E. M. Sullivan. Oct 78, 201p
Contract W-7405-ENG-36

The report summarizes research and development activities of LASL's Biomedical and Environmental Research Program for the calendar year 1977. The principal features of the program have been carried out by groups in the Health Division, supported by the Assistant Secretary for the Environment of the United States Department of Energy. Previous annual reports in this series prepared under the auspices of the United States Atomic Energy Commission and the United States Energy Research and Development Administration are LA-4923-PR (1971), LA-5227-PR (1972), LA-5633-PR (1973), LA-5883-PR (1974), LA-6313-PR (1975), and LA-6898-PR (1976). Technical information related to the current status of projects in the major program areas of each contributing group is presented in sufficient detail to permit the informed reader to assess scope and significance and to obtain specific information from the publications listed in Appendix A. Summaries useful to the casual reader desiring general information have been prepared by the Group Leaders and appear at the beginning of each section of the report. Separate entries were made for various sections of the report. (ERA citation 04:050614)

NTISUB/E/294-019 PC **A03**/MF **A01**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Preclinical and Clinical Studies on Diagnosis, Prognosis, Therapy, and Immunology of Melanomas and Other Skin Cancers.
Special listing.
22 Oct 79, 42p NCI/ICRDB/SL-348
Supersedes NTISUB/E/294-002.

The SPECIAL LISTING of Current Cancer Research Projects is a publication of the INTERNATIONAL CANCER RESEARCH DATA BANK(ICRDB) Program of the National Cancer Institute. Each LISTING contains descriptions of ongoing projects in one selected cancer research area. Approximately 50 different cancer research areas are covered by a separate SPECIAL LISTING. The research areas include: Preclinical studies on diagnosis and treatment of melanomas and other skin cancers; Immunology of human melanomas and other skin cancers; Clinical diagnosis and prognosis of melanomas and other skin cancers; Clinical therapy of melanomas and other skin cancers.

NTISUB/E/294-020 PC **A04**/MF **A01**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Etiology, Epidemiology, and Biology of Melanomas and Other Skin Cancers.
Special listing.
5 Nov 79, 55p NCI/ICRDB/SL-302
Supersedes NTISUB/E/294-001.

The SPECIAL LISTING of Current Cancer Research Projects is a publication of the INTERNATIONAL CANCER RESEARCH DATA BANK (ICRDB) Program of the National Cancer Institute. Each LISTING contains descriptions of ongoing projects in one selected cancer research area. Approximately 50 different cancer research areas are covered by a separate SPECIAL LISTING. The research areas include: Etiological factors in melanoma and skin carcinogensis, and related epidemiology; Biology and biochemistry of melanomas; Biology and biochemistry of skin and skin cancers.

PB80-102445 PC **A03**/MF **A01**
Bureau of Radiological Health, Rockville, MD.
Analysis of Retakes: Understanding, Managing, and Using an Analysis of Retakes Program for Quality Assurance.
Lee W. Goldman, and Scott Beech. Aug 79, 49p
DHEW/PUB/FDA-79/8097, FDA/BRH-79/133
Prepared in cooperation with Baltimore Public Health Service, MD.

The manual describes in detail how to implement a retake collection and analysis study, and how this data may be used to augment a Quality Control program. It includes data analysis techniques as well as instructions and examples for calculating the cost of retakes in each individual facility.

PB80-102692 PC **A05**/MF **A01**
Baylor Coll. of Medicine, Houston, TX.
Development and Evaluation Methods for Control of Viral and Mycoplasmal Respiratory Disease.
Annual rept. 19 Dec 77-15 Nov 78,
Robert B. Couch, Julius A. Kasel, Thomas R. Cate, W. Paul Glezen, and Stephen R. Greenberg. 1 Dec 78, 80p DAB-VDP-12-76
Contract N01-AI-3-2506

Reactogenicity of serotype 2 meningococcal vaccine, lot E-06, is quite acceptable in adults. Correlations with antibody responses and throat cultures for meningococcal carriage await completion of the latter work. Animal studies indicate that a two dose regimen of adenovirus type 5 subunit vaccines will probably be required to effectively immunize seronegative children. Infections with respira-

tory syncytial and parainfluenza type 3 viruses occur with the same frequency in infants under one year of age. Overall, type 3 appears to be less virulent since infections are less likely to result in lower respiratory illnesses that require hospitalization. In addition, there appears to be a relative sparing of infants less than 6 months of age; however, this effect is not related to levels of maternal antibody. In contrast, there is a strong positive correlation between age at time of infection with respiratory syncytial virus and the preexisting maternal antibody level, suggesting that relatively high titers of maternal antibody are protective.

PB80-102833 PC **A02**/MF **A01**
Rockefeller Univ., New York.
Radioimmunoassay for the Quantitative Determination of Human Anti-Meningococcal Antibodies.
Annual rept. 1 Feb 78-30 Apr 79,
Emil C. Gotschlich. 1 May 79, 5p DAB-VDP-12-93
Contract N01-AI-12502
See also PB-263 770.

During the last year of contract support, we have performed a large number of antibody determinations on sera of children vaccinated with Group A or Group C meningococcal polysaccharide. In addition, a number of sera from monkeys vaccinated with different preparations of Group C were also studied. These sera were provided through the efforts of the staff of NIAID and also from other sources.

PB80-105281 PC **A05**/MF **A01**
California Univ., San Francisco. School of Dentistry.
Dietary Habits and Dental Plaque Composition of Fructose-Intolerant Patients.
Final rept. Oct 76-Mar 79,
Ernest Newbrun, and Charles Hoover. Jun 79, 97p NIDR/CR-7912
Contract N01-DE-6-2498

Ingestion of items containing fructose and/or sucrose by persons with hereditary fructose intolerance (HFI) causes severe hypoglycemia, nausea, and vomiting. This study compared diet, oral hygiene, caries scores, plaque microflora, and plaque chemical content of HFI and control subjects. HFI subjects consumed sucrose-containing items less often than control subjects. HFI diets contained significantly less sucrose (4.4 g/day) than control diets (36.4 g/day). HFI subjects had significantly lower DMFT (mean 2.1) and DMFS (mean 3.3) scores than control subjects (DMFT, mean 14.3; DMFS, mean 36.1). The degree of oral hygiene was similar in both groups. However, potentially odontopathic Streptococcus mutans and Lactobacillus were isolated significantly less frequently from HFI than from control subjects. S. sanguis, an ubiquitous commensal, was isolated with equal frequency from both groups. No differences were found in the chemical composition of plaque from HFI and control subjects. The findings support the concept that diet influences the distribution of microorganisms in dental plaque and is therefore an important factor in caries prevention.

PB80-106255 PC **A03**/MF **A01**
Forsyth Dental Center, Boston, MA.
Research Study and Clinical Field Trial Aimed at Determining the Effect of Specific Methods of Fluoride Administration in Controlling Dental Caries.
Final rept.,
Paul F. DePaola, Robert M. Soparkar, Myron Van Leeuwen, and Rosanne DeVelis. 24 Sep 79, 27p NIDR/CR-7913
Contract N01-DE-4-2445

A clinical trial was conducted in a non-F area in which children (mean age = 13.04) were assigned randomly to groups. The rinse was every day in school for 2 years. The gel treatment was for 10 consecutive days at the outset. Clinical and radiographic examinations were conducted at 12, 24, and 36 months. At 24 months the gel and rinse effect were similar and group 4 showed a 31% reduction in DFS. At 36 months (12 months after treatment ended) the gel effect persisted but the rinse effect was non-significant.

UCLA-12-1162 PC **A04**/MF **A01**
California Univ., Los Angeles. Lab. of Nuclear Medicine and Radiation Biology.
Measurement of Regional Cerebral Metabolic Rate for Glucose in the Human Subject with (F-18)-2-Deoxy-2-Fluoro-D-Glucose and Emission Computed Tomography: Validation of the Method.
M. E. Phelps, S. C. Huang, E. J. Hoffman, C. Selin, and D. E. Kuhl. 1977, 51p CONF-7706182-1
Contract EY-76-C-03-0012
Cerebral blood flow symposium, Copenhagen, Denmark, 27 Jun 1977.

Tracer techniques and models of in vitro quantitative autoradiography and tissue counting for the measure of regional metabolic rates (rMR) are combined with emission computed tomography (ECT). This approach, Physiologic Tomography (PT), provides atraumatic and analytical measurements of rMR. PT is exemplified with the regional measurement of the cerebral metabolic rate for glucose (CMRGlu) in man with (exp 18 F)-2-deoxy-2-fluoro-D-glucose (FDG) and positron ECT. Our model incorporates a k sub 4 * mediated hydrolysis of FDG-6-PO sub 4 to FDG which then competes with phosphorylation (k sub 3 *) of FDG back to FDG-6-PO sub 4 and reverse transport (k sub 2 *) back to blood. Although small, k sub 4 * is found to be significant. The ECAT positron tomograph was used to measure the rate constants (k sub 1 * implies k sub 4 *), lumped constant (LC), stability, and reproducibility of the model in man. Since these parameters have not been measured for FDG in any species, comparisons are made to values for DG in rat and monkey. Compartmental concentrations of FDG and FDG-6-PO sub 4 were determined and show that cerebral FDG-6-PO sub 4 steadily accumulates for about 100 mins, plateaus and then slowly decreases due to hydrolysis. Cerebral blood FDG concentration was determined to be a minor contribution to tissue activity after 10 min. Regional CMRGlu measurements are reproducible to +- 5.5% over 5 hrs. PT allows the in vivo study of regional biochemistry and physiology in normal and pathophysiologic states in man with a unique and fundamental capability. (ERA citation 04:050610)

6F. Environmental Biology

AD-A074 180/1 PC **A03**/MF **A01**
California Univ Irvine
Direct Exposure of Monolayers of Mammalian Cells to Airborne Pollutants in a Unique Culture System.
Final rept. 1 Jun 78-30 May 79,
Ronald E. Rasmussen, T. Timothy Crocker, G. Scott Samuelsen, M. E. Witte, and J. T. Taylor. Aug 79, 41p AFOSR-TR-79-0958
Grant AFOSR-77-3343

A mammalian cell culture and exposure system has been developed that allows direct exposure of living cells to atmospheres containing pollutants such as oxidant gases and hydrocarbon vapors. The system is being used to detect cytotoxic effects of various airborne materials as well as their possible mutagenic effects. Oxidant gases include nitrogen dioxide and ozone; other materials include hydrazine, aircraft fuels, and known mutagens such as ethylmethane sulfonate and ethylene oxide. The goals of the project are to detect possible toxic effects of airborne materials and to determine whether synergistic effects may be produced in mixtures of materials found in the environment. Methods have been developed for the small-scale generation of atmospheres containing known mutagens and test materials including hydrazine and its derivatives and common aircraft fuels. Tests for mutagenic effects of gaseous nitrogen dioxide on cultures of hamster lung cells have been negative at concentrations up to 10 ppm in air. (Author)

AD-A074 214/8 PC **A04**/MF **A01**
Abcor Inc Wilmington MA Walden Div
Readily Available Data on 169 Compounds Associated with Operations at Rocky Mountain and Pine Bluff Arsenals.
Technical rept. Sep 77-Dec 78,
David R. Cogley, and Wesley Foy. Dec 78, 73p
Contract DAMD17-77-C-7050

Readily available properties data have been compiled and analyzed for 153 compounds associated with materials manufactured or handled by Shell Chemical Company at Rocky Mountain Arsenal, 10 compounds that have been tentatively identified in surface drainage near Rocky Mountain Arsenal, and 6 pyrotechnic dyes used at Pine Bluff Arsenal. (Author)

AD-A074 286/6 Not available NTIS
California Inst of Tech Pasadena Dept of Applied Mathematics
Spatial Structures in Predator-Prey Communities with Hereditary Effects and Diffusion,
Donald S. Cohen, Patrick S. Hagan, and Henry C. Simpson. 27 Jul 78, 11p ARO-15622.1-M
Contract DAAG29-78-C-0011, Grant NSF-MCS78-03036
Availability: Pub. in Mathematical Biosciences, v44 p167-177 1979 (No copies furnished by DDC).

No abstract available.

CONF-790378-1 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Self-Organizing Characteristics of Ecological Communities.
D. L. DeAngelis, W. M. Post, and C. C. Travis. 1979, 34p
Contract W-7405-ENG-26
Symposium on problems of a theory of self-organizing systems, Bremen, F.R. Germany, 28 Mar 1979.

General patterns of ecological succession are reviewed. Phenomena in which ecosystems create orderly patterns in time and space are illustrated. The use of mathematical models for studying ecosystem self-organization in time and space is discussed. (ERA citation 04:050577)

METC/CR-79/24 PC **A06**/MF **A01**
West Virginia Univ., Morgantown. Dept. of Civil Engineering.
Biological Treatability of Gasifier Wastewater.
W. A. Slack. Jun 79, 116p

Condensate from four producer runs was successfully treated by biooxidation after pre-stripping for ammonia reduction. Assuming only simple phenols in the waste, about 43% of the condensate COD was due to phenol equivalent COD. Pre-stripping with lime rather than caustic resulted in somewhat better organic removals and improved setting of the sludge making lime the stripping agent of choice. Phenol and BOD removals were over 99% and 93% respectively even at detention times as low as 0.58 days. Solids residence times of from 4.4 to 18 days were used. Foaming problems during all biological runs required the addition of small amounts of an antifoam agent. Addition of powdered activated carbon (PAC) at a level of 3000 mg/1 in the aerator allowed the biomass to function even under stressed conditions at relatively high ammonia levels. Biological and bio-PAC runs were made using full-strength stripped condensate under non-stressed conditions. Based on the results of this investigation, biological treatment of the condensate would best be accomplished at dilutions of 1:1 to 1:2. Hydraulic residence times should be 24 to 36 hours while solids residence times of 7 to 10 days appear adequate. It should be possible to achieve TOC and COD reductions of around 80%, while removal of BOD and phenol would be over 95 and 99% respectively. (ERA citation 04:049460)

NUREG/CR-1015 PC **A04**/MF **A01**
Lehigh Univ., Bethlehem, PA. Wetlands Inst.
Analysis of Populations of Boring and Fouling Organisms in the Vicinity of the Oyster Creek Nuclear Generating Station.
Quarterly progress rept. 1 Mar-31 May 79,
K. E. Hoagland, L. Crocket, and J. Harms. Oct 79, 61p
Contract AT(49-24)-0347
See also report dated Sep 79, NUREG/CR-0896.

The growth, distribution, and species composition of marine borers (primarily shipworms) and fouling organisms are being studied in the vicinity of the Oyster Creek Nuclear Generating Station, Barnegat Bay, New Jersey. Untreated wood test panels are used to collect organisms at 16 localities. The

most recent findings covering March-May, 1979, are that at least one subtropical species of the borer family Teredinidae continues to live in Oyster Creek and Forked River. Despite dredging activity in Oyster Creek and unscheduled plant shutdowns, some T. bartschi survived. No settlement of larvae on one-month panels occurred. Much of the fouling in Oyster Creek died due to the dredging activities, and anoxic conditions occurred at stations 11 and 12. This illustrates the continued instability of the Oyster Creek-Forked River area since establishment of the Generating Station.

PB80-101819 PC **A10**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Noise Abatement and Control.
Regulatory Analysis Supporting the Noise Labeling Requirements for Hearing Protectors.
Aug 79, 220p EPA/550/9-79/256

The document contains information used by EPA in developing the Noise Labeling Requirements for Hearing Protectors including: a description of hearing protector devices, factors affecting selection, and a discussion of the various methods for measuring protector effectiveness; the procedure used to calculate single-number effectiveness ratings; an overview of the industry; the Agency's response to comments, and resolution of issues raised during the public comment period; and the participation of the public throughout the development of the regulation.

PB80-102338 PC **A05**/MF **A01**
Midwest Research Inst., Kansas City, MO.
Analysis of Airborne Viable Bacteria at Solid Waste Processing Facilities,
M. W. Fletcher, and D. E. Fiscus. Aug 79, 92p EPA/600/2-79/131
Contract EPA-68-02-1871
See also PB-288 513.

The report presents a synopsis of aerobiological testing methodologies used by Midwest Research Institute during studies conducted for the Environmental Protection Agency. The purpose of the programs was to determine relative levels of airborne bacteria and virus aerosols within and around waste handling facilities. The facilities tested were the St. Louis Refuse Processing Plant, the Browning Ferris/Raytheon Service Company Resource Recovery Plant (Houston), and at three other types of waste handling facilities, i.e., an incinerator, a waste treatment plant, and a landfill. The report presents microbiological air sampling methodologies, field sample handling procedures, and laboratory analysis methodologies. It also includes a general discussion of pertinent considerations, recommendations for future research, and an extensive bibliography.

PB80-102734 PC **A03**/MF **A01**
Environmental Monitoring and Support Lab., Las Vegas, NV.
Assessment of Macroinvertebrate Monitoring Techniques in an Energy Development Area: A Test of the Efficiency of Three Macrobenthic Sampling Methods in the White River.
Final rept. 1977-78,
J. E. Pollard, and W. L. Kinney. Jul 79, 36p EPA/600/7-79/163
Prepared in cooperation with Nevada Univ., Las Vegas. Dept. of Biology.

Three methods of macroinvertebrate collection were evaluated for selectivity, reproducibility, capture-effectiveness, and cost efficiency in the White River near Meeker, Colorado. Samples were collected with a standard Surber sampler, with a portable invertebrate box sampler (PIBS), and using the standardized traveling kick method (STKM). Methods were evaluated in riffles of the White River directly upstream and downstream from the confluence of Piceance Creek, as well as at a comparable riffle at an upstream control station. The traveling kick method collected the largest number of animals and taxa per sample with equivalent or lower variability than the other two methods tested. While Surber samplers and the PIBS performed similarly in the vicinity of Piceance Creek, their performance differed at the upstream control station where the PIBS collected more animals and taxa per sample than the Surber sampler. Similarly, while sample processing time did not significantly differ for the various methods of collection used at any station in the vicinity of Piceance Creek, differences did exist at the upstream control station with kick samples requiring the greatest amount of processing time and Surbers requiring the least. The cost efficiency of various methods was estimated by calculating the number of animals processed per unit time and the number of hours required to provide standing crop estimates for each sample within a given precision level. Cost-efficiency estimates indicated that the STKM was superior to the Surber or PIBS methods, particularly at the station near Piceance Creek.

PB80-103211 PC **A07**/MF **A01**
Southwest Research Inst., San Antonio, TX.
Environmental Monitoring of a Wastewater Treatment Plant.
Final rept. Oct 77-Mar 78,
D. E. Johnson, D. E. Camann, H. J. Harding, and C. A. Sorber. Aug 79, 135p EPA/600/1-79/027
Grant EPA-R-805533

A wastewater aerosol monitoring program was conducted at an advanced wastewater treatment facility using the activated sludge process. This plant was recently constructed next to an elementary school in Tigard, Oregon. Wastewater aerosols containing pathogenic organisms are generated by the aeration basin (within 400 meters of the classroom area) and by an aerated surge basin (within 50 meters of the school playground). From a preliminary microbial screen of the wastewater, predominant indicator and pathogenic microorganisms were selected for routine wastewater and aerosol monitoring. The geometric mean aerosol concentrations at 30 to 50 meters downwind of the aeration basin were 5.8 cfu/cu.m. of total coliforms, 2.0 cfu/cu.m. of fecal streptococci, 9.1 cfu/cu.m. of mycobacteria, 7 cfu/cu.m. of Pseudomonas, 0.7 pfu/cu.m. of coliphage, and <0.0009 pfu/cu.m. of enteroviruses. The inability to detect enteroviruses in air resulted from their low concentration (relative to other test organisms) in the wastewater and from their adsorption onto and incorporation into the mixed liquor suspended solids which are not easily aerosolized. While it is a relatively insensitive measure, attendance at the nearby school and eight control schools provided no evidence of adverse effects from wastewater treatment plant operation. If any adverse effects had occurred, it was slight enough to be completely obscured by the usual school absenteeism factors.

PB80-103500 PC **A03**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Plant Pathology and Physiology.
Oxidant Air Pollution Impact to the Forests of Eastern United States: A Literature Review,
John M. Skelly, and J. William Johnson. Apr 79, 39p EPA/600/3-79/045

This report presents a review of past studies that have attempted to delineate measurable and/or possible impacts of photochemical oxidants on the forests of Eastern United States. Sources of oxidant precursors and subsequent long distance transport phenomena are reviewed and documented. A brief historical treatment of eastern white pine responses to air pollutants is followed by an up-to-date evaluations of current air pollution measurements and associated impacts. Potential threats to eastern forest tree species are reviewed through a comparison of various fumigation studies in laboratory and field situations. The concept of hidden injury is discussed as being a possible major impact problem facing analysis of real losses. The authors present evidence that would suggest that many forest tree species indigenous to the Eastern United States may already be detrimentally impacted by previous high oxidant episodes. They further suggest that even more drastic and only long term reversible effects to the forest ecosystem will follow a trend of increasing oxidant air pollution in many major forested regions of this area of the United States.

UR-3490-1557 PC **A02**/MF **A01**
Rochester Univ., NY. Dept. of Radiation Biology and Biophysics.
Behavioral Procedure and 60 Hertz Exposure System for Determining Field Detection by Rats.
S. Stern, V. G. Laties, C. Stancampiano, G. B. Inglis, and E. Carstensen. 1979, 4p CONF-790626-2
Contract EY-76-C-02-3490
16. design automation conference, San Diego, CA, USA, 25 Jun 1979.

A new system has been constructed to determine the threshold for detecting 60 Hertz electric fields by the rat. A variant of the Method of Constant Stimuli, which has been studied intensively by other investigators for determining the thresholds of animals to a variety of stimuli, will be used in the present study. The present report describes significant features of both the exposure system and behavioral paradigm designed to study the sensitivity of the rat to 60 Hertz electric fields. (ERA citation 04:050634)

6G. Escape, Rescue, and Survival

AD-A074 143/9 PC **A02**/MF **A01**
Defence Research Establishment Ottawa (Ontario)
A Physiological Evaluation of Canadian Forces Seat-Pack Survival Sleeping Bags.
Technical note,
Richard W. Nolan, and Stanley W. Cattroll. Jun 79, 14p Rept no. DREO-TN-79-10
Abstract in French.

The Standard Canadian Forces survival sleeping bag and a prototype survival sleeping bag of different design were evaluated simultaneously using test subjects resting in the cold chamber at -23 C. A series of tests was conducted to compare the thermal protection afforded by each type of bag. No significant differences between sleeping bags were found. Subjects preferred the prototype bag for ease of entry and exit. (Author)

6H. Food

AD-A074 173/6 PC **A03**/MF **A01**
Army Natick Research and Development Command MA
Evaluation of Insect-Resistant-Treated Food Sacks for Mold Resistance.
Final rept.,
B. J. Wiley, M. Greenberger, and A. M. Kaplan. Jun 79, 33p Rept no. NATICK/TR-79/029

Insect-Resistant-Treated (IRT) food sacks were evaluated for mold resistance under field conditions, and in the laboratory using plate, tropical chamber and soil burial tests. Penetration of fungal growth through the layers of the multiwall food sacks was also evaluated. Mycotoxin production was determined using known aflatoxin-producing fungus strains as controls. This determination was needed because 15 of the 69 strains of fungi isolated from the food sack samples used in the field study represented two groups of organisms known to produce carcinogenic metabolites during growth. (Author)

PATENT-4 148 929 Not available NTIS
Department of the Army Washington DC
Stabilized Frozen Potato Salad.
Patent,
Harold Gorfien, Abdul R. Rahman, and Donald E. Westcott. Filed 27 Dec 77, patented 10 Apr 79, 3p AD-D006 348/7, PAT-APPL-864 892
Supersedes PAT-APPL-864 892-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A freeze and thaw stabilized potato salad product and method of producing the same wherein the salad dressing incorporated in the potato salad has a hydrocolloid, e.g., gelatin, added thereto to effect stabilization and prevention of the separation of oil from the salad dressing upon thawing of the frozen potato salad containing such modified salad dressing. (Author)

PB80-100084 PC **A03**/MF **A01**
Department of Agriculture Extension Service, Washington, DC.
Sechez vos Fruits et Legumes au Soleil (Sun Dry Your Fruits and Vegetables),
Helen Strow, and Evelyn Spindler. Jul 58, 43p
Text in French. See also English version, PB-293 560. Sponsored in part by Agency for International Development, Washington, DC.

The sun drying process is explained, which fruits and vegetables can be sun dried. The importance of cleanliness and of the conditions of the air atmosphere are stressed. The different steps to sun dry fruits, with the answers as to how, why, when, are answered. Selection of fruits and manipulability is discussed, as well as the sulfitation process, with material and equipment required. Listing of different fruits and the different methods are given. Same is done for the vegetables with the addition of steam cooking. Also discussed is the reverse process, namely, how to prepare sundried fruits and vegetables for consumption. This is translated from a booklet called 'Sun Dry Your Fruits and Vegetables'.

PB80-101629 PC **A06**/MF **A01**
Office of Technology Assessment, Washington, DC.
Open Shelf-Life Dating of Food.
Aug 79, 119p OTA-F-94
Library of Congress catalog card no. 79-600128.

In their concern over the freshness of food, consumers have increasingly advocated open shelf-life dating--the use of dates on a can or package of food that gives the consumer some idea of when a product was packed or should be sold or used. Although such a step appears simple and sensible at first glance, it entails many scientific and financial uncertainties and involves some complex choices. The Senate Committee on Commerce, Science, and Transportation asked OTA to assess the feasibility of open shelf-life dating of food and to provide Congress with the necessary information to adequately address this area of food labeling. This assessment analyzes: consumers' perspectives on open-date labeling; benefits and costs; alternative systems and techniques; alternative criteria and scientific tests to establish open dates; enforcement mechanisms and liability related to open-date labeling; and options available to Congress.

PB80-102395 PC **A09**/MF **A01**
Nebraska Univ., Lincoln. Food Protein Research Group.
Development of Methodologies for Rapidly Assessing the Protein Quality of Foods.
Final rept.,
Robert Nesheim, Ray Anderson, C. E. Bodwell, James Hassler, and Irving Rusoff. Jul 79, 185p NSF/RA-790104
Grant NSF-AER76-20692

Two interrelated aspects of protein quality are investigated: in vitro measurement of protein digestability, and estimation of the protein efficiency ratio via a computational process and a tetrahymena based assay. The in vitro digestability procedure duplicates in vivo assays over a range of 67.70 to 92.38% with an overall standard error of estimate of 2.47%. The final computed PER model (DC-PER) predicts values of protein quality over a range of 0.30 to 3.22 PER, with a standard error of 0.23 PER units compared to rat assays. The tetrahymena assay predicts protein quality (T-PER) as a function of in vitro digestability and the growth of the organism after a 66 hour period with a standard error of estimate of 0.51 PER units. It was found that food additives, spices, and/or spice oleoresins affect organism growth. A comparison between rat and human in vivo digestabilities and three in vitro protein digestability procedures indicate that the purified enzyme in vitro and the human pancreatic enzyme assays can be used to accurately predict human and rat in vivo protein digestabilities. Further collaborative studies to test the ability to duplicate the four enzyme in vitro protein digestability and C-PER protein quality assays are reported.

6L. Medical and Hospital Equipment

HRP-0027961/2 Not Available NTIS
Brook General Hospital, London (England).
Clinical Study of the EMI Scanner -- Implications for Provision of Neuroradiological Services.
J. R. Bartlett, and G. Neil-Dwyer. 1978, 3p
Pub. in British Medical Jnl. v2 n6140 p813-815 16 Sep 78.

A study of the impact of the installation of an EMI computerized axial tomography (CAT) brain scanner at Brook General Hospital in London, England in 1976 revealed significant positive results. The study involved assessment of the first 571 patients to be examined with the EMI scanner. Clinical diagnosis (e.g., head injuries and congenital abnormalities) were used as the basis for dividing the patients into groups. An estimate was then made of the number of contrast radiological procedures that would have been performed if a scanner had not been available. Finally, the estimated number of investigations without a scanner was compared with the number performed. The number of contrast investigations was found to have been significantly reduced. The scanner proved effective not only as a diagnostic tool, but as an aid in planning treatment. There were only five cases in which clinical factors necessitated further investigation that showed the scan to be wrong. These errors were sometimes due to lack of sufficient attention to such details as the straightness of pictures or incomplete examination. It is felt that management of patients with head injuries can benefit greatly from use of the CAT scanner. By providing knowledge of the nature of the intracranial events, the scanner can remove the fear that a treatable lesion may be missed or recognized too late. The introduction of the CAT scanner reduced radiology workloads significantly.

PB80-101116 PC **A21**/MF **A01**
Joint Center for Graduate Study, Richland, WA.
Implanted Energy Conversion System.
Annual rept. 1 May 78-1 Mar 79,
R. P. Johnston, A. Bennett, S. G. Emigh, D. H. Gray, and J. R. Noble. Aug 79, 487p JCGS-7908/217, NIH-N01-HV-4-2901-6
Contract N01-HV-4-2901
See also PB-272 609.

The JCGS thermal energy converter program objective is to develop clinically useful permanently implantable Stirling/hydraulic power sources to operate heart-assist or full-heart replacement blood pumps. The energy source is heat from an electric heater or from a radioisotope which could provide complete system implantability. Development has progressed through seven system configurations. Stirling Engine 5 has accumulated 6.3 years of operating time and has demonstrated 4.1 years of maintenance-free operation before failure. The short-stroke pump actuator/controller on accelerated life test has demonstrated 6.6 equivalent years of maintenance-free life without failure and accumulated a total of 16.5 equivalent years of operation. System 5 in-vivo test demonstrated circulation of all systemic blood flow throughout 175-hour test. System 3 complete power source demonstrated 15.5% efficiency, 1.2 liter volume, and 2.4 kg weight. System 7 engine module has demonstrated 20.1% efficiency with 0.2 liter volume and 0.7 kg weight.

PB80-101546 PC **A03**/MF **A01**
Monsanto Research Corp., Dayton, OH. Dayton Lab.
Physical Testing of Polymers for Use in Circulatory Assist Devices.
Annual rept. no. 2, 1 Jun 78-31 May 79,
Carl R. McMillin, David L. Sheppard, and Thomas A. Orofino. Jul 79, 47p MRC-DA-892
Contract N01-HV-7-2918
See also report dated Jun 78, PB-286 129.

Fatigue life comparisons of candidate elastomers for use in the artificial heart have been made under various conditions. These include: (1) cyclical, progressively increasing, uniaxial strain in air, saline, and in-vitro blood media; (2) progressive uniaxial strain in the same media, with prior cut-growth initiation of samples; (3) cyclical, biaxial strain in an air environment, accelerated by introduction of various stress concentrators in the samples. Materials evaluated were NBS butyl rubber, Upjohn Pellethane, Goodyear Hexsyn, and Thoratec Biomer. The order of ranking of fatigue lifetime was not the same for the tests cited, and the mode of failure differed for filled (butyl rubber, Hexsyn) and unfilled elastomers. Various characterization data for the materials investigated are also given, including thermal properties, permeabilities, density, and molecular weight.

6M. Microbiology:

AD-A073 957/3 PC **A02**/MF **A01**
Clemson Univ SC Dept of Microbiology
Solid Waste Cellulose Degradation by Thermomonospora Curvata.
Final rept. 15 Jun 76-15 Jun 79,
Fred J. Stutzenberger. 20 Aug 79, 17p ARO-13538.5-L
Grant DAAG29-76-G-0256

The cellulolytic potential of Thermomonospora curvata, a thermophilic actinomycete isolated from municipal solid waste compost, was evaluated. Studies on induction and repression of cellulase synthesis revealed that lactose, a potent inducer in Trichoderma, is a repressor in T. curvata, whereas cellobiose acts as inducer. Cellulase production is greatly influenced by Ca concentration and completely inhibited by low levels of pyridinium herbicides. T. curvata rapidly degrades a wide variety of solid waste cellulosic materials including some types of coated wrapping materials. (Author)

AD-A073 990/4 Not available NTIS
Connecticut Univ Health Center Farmington Dept of Biochemistry
Purification and Properties of Phosphoglycerate Phosphomutase from Spores and Cells of 'Bacillus megaterium',
Ravendra P. Singh, and Peter Setlow. 30 Oct 78, 4p ARO-14479.10-L
Grant DAAG29-77-G-0070
Availability: Pub. in Jnl. of Bacteriology, v137 n2 p1024-1027 Feb 79 (No copies furnished by DDC).

No abstract available.

AD-A074 074/6 PC **A03**/MF **A01**
BioResearch Inc Farmingdale NY
Development of a Methodology for the Rapid Detection of Coliform Bacteria.
Annual rept. 1 Sep 78-30 Aug 79,
A. M. Cundell, Janet E. Porter, Anna M. Pisani, and Eugene Findl. Sep 79, 27p Rept no. ER-070179
Contract N00014-78-C-0713

Work was continued on the development of a rapid method for the counting of coliform bacteria, based on the hydrolysis of a fluorogenic substrate by the enzyme beta-D-galactosidase. The procedure was extended to differentiate between total coliforms and fecal coliforms by elevating the test temperature from 35 C to 44.5 C. The effect of various concentrations of chlorine on the coliform contained enzyme beta-D-galactosidase was also investigated to confirm that the fluorescence technique was comparable to the standard multiple tube fermentation technique. Work was also continued on evaluating two bacterial concentration techniques; continuous flow centrifugation and stirred cell filtration. Preliminary experimentation was conducted on a procedure to eliminate bacterial concentration, yet permit detection and quantitation down to the 2 bacteria per ml level. This procedure involved the microencapsulation of bacteria in liquid membranes prior to passage through a fluorescence flow cytometer. Validation of the rapid coliform-counting procedure for the examination of field-collected water samples was incomplete, due to winter weather conditions and the late arrival of continuous flow centrifugation components.

AD-A074 255/1 Not available NTIS
North Carolina State Univ Raleigh Dept of Microbiology
Microbial Cooxidations Involving Hydrocarbons,
Jerome J. Perry. 1978, 15p ARO-13575.3-L
Grant DAAG29-76-G-0159
Availability: Microbiological Reviews, v43 n1 p59-72 Mar 79 (No copies furnished by DDC).

No abstract available.

AD-A074 256/9 Not available NTIS
Massachusetts Inst of Tech Cambridge Dept of Nutrition and Food Science
Sensitization of 'Clostridium perfringens' Spores to Heat by Gamma Radiation,
David E. Gombas, and Reinaldo F. Gomez. 3 Jul 78, 5p.p ARO-13611.2-LX

Contract DAAG29-76-C-0034
Availability: Applied and Environmental Microbiology, v36 n3 p403-407 Sep 78 (No copies furnished by DDC).

No abstract available.

AD-A074 343/5 Not available NTIS
Connecticut Univ Health Center Farmington Dept of Biochemistry
Enolase from Spores and Cells of Bacillus megaterium: Two-Step Purification of the Enzyme and Some of Its Properties,
Ravendra P. Singh, and Peter Setlow. 1 Dec 77, 3p ARO-14479.3-L
Contract DAAG29-77-G-0070
Availability: Pub. in Jnl of Bacteriology, v134 n1 p353-355 Apr 78 (No copies furnished by DDC).

No abstract available.

PB80-101728 PC **A02**/MF **A01**
Saint Jude Children's Research Hospital, Memphis, TN.
Preparation of Isolated Hemagglutinin, Neuraminidase, Matrix and Nucleoprotein Subunits of Influenza Viruses and Assay of Their Immunogenicity.
Annual rept. 1 Jun 78-31 Mar 79,
R. G. Webster. 10 Apr 79, 13p DAB-VDP-01-97
Contract N01-AI-4-2510
See also PB-297 281.

The objectives of the research are: (1) To prepare the HA, NA, M, and NP proteins of the current vaccine strain of influenza A in an immunologically pure state suitable for parenteral use in man. (2) To prepare combinations and aggregates of these proteins and evaluate the efficacy of the products as immunogens. (3) To prepare - on request - lots of subunit vaccine; to safety test and evaluate their immunogenicity for use in clinical evaluations.

6P. Physiology

AD-A074 010/0 Not available NTIS
Temple Univ Philadelphia PA Radiology Research Lab
Eye Movements During Visual Search for Artistically Embedded Targets,
Calvin F. Nodine, Dennis P. Carmody, and Edward Herman. 23 Feb 79, 4p ARO-14146.1-L
Contract DAAG29-76-G-0313
Availability: Pub. in Bulletin of the Psychonomic Society, v13 n6 p371-374 1979 (No copies furnished by DDC).

No abstract available.

AD-A074 027/4 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Defective Transient Endogenous Spleen Colony Formation in S1/S1d Mice.
Medical research progress rept.,
W. Wiktor-Jedrzejczak, A. Ahmed, S. J. Sharkis, A. McKee, and K. W. Sell. 2 May 78, 8p Rept no. NMRI-79-16
Pub. in Jnl. of Cellular Physiology, v99 n1 p31-35 Apr 79.

No abstract available.

PB80-100621 CP **T06**
National Inst. of Child Health and Human Development, Bethesda, MD. Center for Population Research.
REPSIM-B: A Computer Simulation Model of Human Reproduction.
Model-Simulation,
Raymond Geremia, and Jeanne Clare Ridley.
1979, mag tape NIH/DF-79/005
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB80-100639.

REPSIM-B simulates the detailed reproductive history of a hypothetical cohort of woman. The computer program provides for a woman's marrying, dying, becoming sterile, becoming pregnant and for varying outcomes of pregnancy, including induced abortion. Provision is also made for a woman to adopt contraception or become surgically sterilized. The dissolution of marriage by widowhood or divorce as well as remarriage is provided for. The probabilities of these events may vary with age and marital status. In many instances, the probabilities may also vary with parity, a woman's preference regarding the spacing between births and the difference between a woman's desired family size and her number of surviving children...Software Description: The program is written in Fortran IV programming language for implementation on a IBM computer using the IBM3400-2 operating system. 262K bytes of core storage are required to operate the model.

PB80-100639 PC **A99**/MF **A01**
Georgetown Univ., Washington, DC. Center for Population Research.
REPSIM-B: A Computer Simulation Model of Human Reproduction,
Jeanne Clare Ridley, Alice S. Clague, Joseph C. Ott, Susan S. Pastroff, and C. M. Suchindran.
1979, 642p NIH/DF-79/005A, NICHD/CPR/OD-79/2
Contract N01-HD-3-2726
For system on magnetic tape, see PB80-100621.

The monograph presents illustrative applications and technical details of the computer simulation model REPSIM-B, which was developed for studying a number of important social and biological factors affecting the human reproductive process. REPSIM-B simulates the detailed reproductive history of a hypothetical cohort of women. The computer program provides for a woman's marrying, dying, becoming sterile, becoming pregnant and for varying outcomes of pregnancy, including induced abortion. Provision is also made for a woman to adopt contraception or become surgically sterilized. The dissolution of marriage by widowhood or divorce as well as remarriage is provided for. The probabilities of these events may vary with age and marital status. In many instances, the probabilities may also vary with parity, a woman's preference regarding the spacing between births, and the difference between a woman's desired family size and her number of surviving children.

6Q. Protective Equipment

PB80-103039 PC **A06**/MF **A01**
Bureau of Radiological Health, Rockville, MD.
Evaluation of Commercially Available Laser Protective Eyewear.
Final rept.,
Kenneth R. Envall, and Ross Murray, Jr. May 79, 102p DHEW/PUB/FDA-79/8086, FDA/BRH-79/110
Prepared in cooperation with USAF School of Aerospace Medicine, Brooks Air Force Base, TX. See also report dated Mar 75, PB-241 903.

Forty commercially available laser protective eyewear materials and ten representative frames were evaluated under non-stress and stress conditions by the U.S. Air Force School of Aerospace Medicine (USAFSAM) under an interagency agreement with the Bureau of Radiological Health. Parameters such as optical density, spectral transmission, luminous transmittance, refractive and prismatic effects, haze, and impact resistance were determined and, where possible, compared to ANSI recommended criteria for occupational eye and face protection. In addition, all materials were subjected to shelf-life, environmental, and laser-induced damage tests to determine damage limits and characteristics. This report, intended for laser users, summarizes the more comprehensive final report submitted by USAFSAM (Technical Report 78-30) and includes testing methodology, experimental apparatus, structural and spectral changes in materials, and guidance in selecting appropriate eyewear.

SAND-79-0147C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
PLZT Thermal/Flash Protective Goggles: Device Concepts and Constraints.
J. T. Cutchen. 1979, 6p CONF-790670-1
Contract EY-76-C-04-0789
IEEE international symposium on application of ferroelectric, Minneapolis, MN, USA, 13 Jun 1979.

In 1975 Sandia Laboratories began the design and development of PLZT Goggles for the US Air Force to provide protection from temporary flashblindness and permanent retinal burns caused by the brilliant flash of nuclear explosions. The user requirements, system and physical constraints, and use/storage environments were all considered in arriving at the final design goals. When the program began, there was no industrial capability to manufacture large-aperture PLZT materials or bonded lens assemblies. The technology has been established from a laboratory baseline in a brief period, and operational testing and evaluation by the Air Force has been completed. The goggles, identified as the EEU-2/P,, are now in production. (ERA citation 04:048995)

6R. Radiobiology

AD-A074 156/1 PC **A05**/MF **A01**
Texas Univ at Austin Biomedical Engineering Lab
Experimental Validation of Thermal Retinal Models of Damage from Laser Radiation.
Final rept. Aug 76-Apr 78,
Ashley J. Welch, Leslie A. Priebe, Larry D. Forster, Robert Gilbert, and Clement Lee. Aug 79, 76p BME-1 -1978, SAM-TR-79-9
Contract F33615-76-C-0605

This research concerns the validation of a model for the mathematical prediction of laser-radiation thermal damage on the eye. The model developed by IITRI for the Air Force has four distinct steps: (1) The laser image at the retina is computed. (2) The amount of heat generated by absorption of light in the pigment epithelium, choriocapillaris, and chorioid is computed. (3) This heat is used in the linear heat-conduction equation to calculate the laser-induced temperature rise in the eye. (4) The potential of damage for any point of the fundus is found with a sequence of first-order rate process equations which use the computed temperature-time histories. The University of Texas conducted a seris of dye cell and animal experiments for the purpose of validating the IITRI model. In the dye cell experiments, retinal absorption was modeled as a single homogeneous absorbing layer with known optical, thermal, and geometric parameters. In the second set of experiments we measured the retinal intensity profile, temperature rise, threshold power, and extent of damage as a function of wavelength, beam radius, intensity distribution, and exposure duration in the monkey eye. (Author)

CONF-781181-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Development of a Mid-Head Tissue Dose Response Function.
D. K. Trubey, D. E. Bartine, J. V. , Pace, III, and J. R. Knight. 1978, 4p
Contract W-7405-ENG-26
American Nuclear Society meeting, San Francisco, CA, USA, 12 Nov 1978.

The technique used in this investigation was to calculate the radiation transport in a two-dimensional adjoint model by the discrete ordinates code DOT 3.5. An S sub 8 P sub 3 approximation was used. The adjoint source was taken to be the tissue kerma response in a 1-cm-radius region in the center of the head. The procedure was to then calculate in the adjoint mode the current on the surface of the phantom model. The adjoint leakage gives the response function for scoring an isotropic incident radiation field, and the exit adjoint angular flux gives the response for angular-dependent incident radiation. The head models employed were basically those suggested by Warshawsky for use in correlating radiation dose received in monkeys during experiments at the Armed Forces Radiological Research Institute with personnel dose received in a nuclear weapons environment. (ERA citation 04:050613)

PB80-100852 Not available NTIS
National Bureau of Standards, Washington, DC.
The Traceability Program for Radiopharmaceuticals at the United States National Bureau of Standards,
L. M. Cavallo, D. B. Golas, and W. B. Mann.
1979, 2p
Pub. in A.N.Z. Nuclear Medicine Newsletter, p15-16 1979.

The regulation of the use of radiopharmaceuticals and the traceability of measurements of their activ-

ity to the National Radioactivity Measurements System in the United States are described.

PB80-101124 PC **A06**/MF **A01**
Office of Radiation Programs, Washington, DC. Div. of Criteria and Standards.
A Computer Code for Cohort Analysis of Increased Risks of Death (CAIRD).
Technical rept.,
John R. Cook, Bryon M. Bunger, and Mary K. Barrick. Jun 78, 119p EPA/520/4-78/012

The most serious health risk confronting individuals exposed to radiation is death from an induced cancer. Since cancers usually do no develop until many years after exposure, other causes of death may intervene and take the lives of those destined to die from cancer. This computer code has been developed to aid risk analysis by calculating the number of premature deaths and loss of years of life produced by a hypothetical population after exposure to a given risk situation. The code generates modified life tables and estimates the impact of increased risk through several numerical comparisons with the appropriate reference life tables. One of the code's frequent applications is in estimating the number of radiation induced deaths that would result from exposing an initial population of 100,000 individuals to an annual radiation dose. For each risk situation analyzed, the computer code generates a summary table which documents the input, data and contains the results of the comparisons with reference life tables.

PB80-101983 PC **A03**/MF **A01**
Office of Radiation Programs, Washington, DC. Div. of Criteria and Standards.
Plutonium Air Inhalation Dose (PAID): A Code for Calculating Organ Doses Due to the Inhalation and Ingestion of Radioactive Aerosols.
Technical memo.,
Robert E. Sullivan. Jun 77, 50p ORP/CSD-77/4

The technical note describes a computer code, PAID developed to determine time dependent dose rates and doses from inhaled or ingested radionuclides. The main purpose of this code is to determine the dose rates and doses caused by the intake of transuranic nuclides and their decay products. The two primary modes leading to internal radiation exposure are the inhalation and ingestion of radioactive materials. The estimation of organ burden and exposure, as well as of the resulting dose rates and doses, due to uptake by these pathways is relatively complicated and requires the adoption of mathematical models which depend on many parameters. A computer code which implements the lung model described by the ICRP Task Group on Lung Dynamics is presented below. This model has been augmented to also include the dose due to the transfer of radioactivity to other organs from ingested materials.

PB80-102940 PC **A07**/MF **A01**
Collaborative Radiological Health Animal Research Lab., Fort Collins, CO.
CSU-FDA Collaborative Radiological Health Laboratory Annual Report 1978,
Stephen A. Benjamin. Aug 79, 150p DHEW/PUB/FDA-79/8042, FDA/BRH-79/129
Contracts FDA-72-302, FDA-223-76-6002
Prepared in cooperation with Colorado State Univ., Fort Collins. Coll. of Veterinary Medicine and Biomedical Sciences. See also report dated Sep 77, PB-273 560.

The Division of Biological Effects of the Bureau of Radiological Health, Food and Drug Administration, plans, conducts, and supports experimental and epidemiologic research on the biological effects of exposure to ionizing and nonionizing radiation. Through intramural and extramural epidemiologic studies and laboratory investigations, and critical reviews of the literature, the division studies and evaluates possible health effects resulting from exposure to radiation. Of particular interest are effects of the low radiation doses to which large segments of the population may be exposed. The Collaborative Radiological Health Laboratory was conceived in 1962 as a joint undertaking between the Division of Biological Effects, BRH, and the Department of Radiology and Radiation Biology at Colorado State University. The Laboratory's primary responsibility is to conduct a long-term study of the mortality, morbidity, and physiopathology of beagles exposed to a single low dose of ionizing radiation in utero or early in life. The results of this study will provide insight into the lifetime risks associated with pre- and postnatal exposure to low levels of ionizing radiation. The research program has been separated into three segments. The major study (Segment III) involving 1,680 beagles was initiated in December 1967. Supportive studies (Segments I and II) designed to provide basic information necessary for evaluating delayed effects were initiated in 1964.

UR-3490-1556 PC **A02**/MF **A01**
Rochester Univ., NY. Dept. of Radiation Biology and Biophysics.
Microwaves Affect Thermoregulatory Behavior in Rats.
S. Stern, L. Margolin, B. Weiss, S. T. Lu, and S. M. Michaelson. 1979, 4p CONF-790627-1
Contract EY-76-C-02-3490
Bioelectromagnetics symposium, Seattle, WA, USA, 18 Jun 1979.

Rats, with their fur clipped, pressed a lever to turn on an infrared lamp while in a cold chamber. When 2450 Megahertz continuous wave microwaves were presented for 15 minutes, the rate of turning on the infrared lamp decreased as a function of the microwave power density, which ranged between 5 MW/cm exp 2 and 20 MW/cm exp 2 . This result indicates that behaviorally significant levels of heating occur at exposure durations and intensities that do not produce reliable changes in either colonic temperature or other behavioral measures. Further study of how microwaves affect thermoregulatory behavior may help us understand phenomena such as reported non-thermal behavioral effects of microwaves. (ERA citation 04:050633)

6S. Stress Physiology

AD-A074 026/6 PC **A02**/MF **A01**
Naval Medical Research Inst Bethesda MD
Species Differences in Decompression.
Medical research progress rept.,
T. E. Berghage, T. D. David, and C. V. Dyson. Mar 78, 16p Rept no. NMRI-79-12
Pub. in Undersea Biomedical Research, v6 n1 p1-13 Mar 79.

No abstract available.

AD-A074 069/6 PC **A02**/MF **A01**
Army Research Inst of Environmental Medicine Natick MA
Effects of Physical Training and Cardiorespiratory Physical Fitness on Exercise-Heat Tolerance: Recent Observations,
Kent B. Pandolf. Oct 78, 11p Rept no. USARIEM-MISC-2/78
Presented at the Annual Meeting of the American Coll of Sports Medicine (25th), Washington, DC 24-27 May 78. Pub. in Medicine and Science in Sports, v11 n1 p60-65 1979.

No abstract available.

AD-A074 235/3 PC **A02**/MF **A01**
Naval Health Research Center San Diego CA
Stress, Fatigue, and Work-Rest Cycles Associated with Deep Submergence Rescue Vehicle Fly-Away Evolution.
Interim rept.,
David A. Hall, Richard E. Townsend, and John Knippa. Jun 79, 16p Rept no. NAVHLTHRSCHC-79-16

To obtain information on stress, fatigue, and work-rest cycles of both submersible operators and surface support crew members during an actual submarine rescue fly-away mission, six operators and seven surface support personnel (SSP) were monitored during the conduct of a six day trial open-sea submarine rescue evolution using the Deep Submergence Rescue Vehicle (DSRV), Mystic. Operators and crew members lived aboard the mother submarine which carried the DSRV from port to the site of the downed submarine and return. Demographic information, psychological measures, performance measures and environmental data were obtained during pre-deployment, transit-out, at dive site, and transit-in periods. The overall results suggested that a DSRV mission of the present duration and difficulty can be accomplished without exceeding the capabilities of the crew and support personnel. The trend of the changes does, however, suggest that missions of longer duration may require scheduling of regular sleep periods for personnel to maintain performance. (Author)

6T. Toxicology

IS-M-205 PC **A02**/MF **A01**
Ames Lab., IA.
Trace Element Levels in Native Vegetation as a Measure of Aerosol Deposition.
J. J. O'Toole, T. E. Wessels, and K. L. Malaby. 4p
Contract W-7405-ENG-82

As part of an environmental assessment program, extensive analysis for over thirty elements was completed in five species of native flora in the Fort Union Basin of eastern Montana. Levels of trace elements in foliage collected at the beginning and end of the growing season has provided data on their rates of change during this period. Elements deposited on leaf surfaces from soil and anthropogenic sources have been evaluated as they relate to time, site location and trace element source. Through changes observed in trace element ratios, the sources of root uptake and aerial deposition can be distinguished. (ERA citation 04:050627)

PB80-101595 PC **A06**/MF **A01**
Oregon State Univ., Corvallis. Dept. of Fisheries and Wildlife.
Assessment of Clinical Procedures to Evaluate Liver Intoxication in Fish,
William H. Gingerich, and Lavern J. Weber. Aug 79, 120p EPA/600/3-79/088
Grant EPA-R-803090

Procedures were developed to clinically evaluate liver damage and liver function in rainbow trout following either acute intraperitoneal (i.p.) treatment or subacute bath exposure to selected mammalian hepatotoxic agents. Elevations in serum of liver specific enzymes such as aspartate aminotransferase (GOT), alanine aminotransferase (GPT) and alkaline phosphatase (AP) were investigated as potential indicators of hepatocellular damage. An exogenous test of liver function, plasma clearance of the organic anion sulfobromophthalein (BSP), also was investigated as a potentially useful test of overall liver function in the trout. The application of clinical tests to diagnose liver dysfunction in fishes following their exposure to environmental toxicants may be practical in controlled laboratory facilities. Despite the considerable variation that exists between groups of fish, significant differences could be demonstrated between control and treated fish. Variation among groups of fish make intergroup comparison of the field populations increasingly difficult by these methods. Therefore, the use of such techniques should be employed to evaluate liver toxicity under precisely controlled laboratory studies. Their application to field studies does not seem advisable.

PB80-101637 PC **A04**/MF **A01**
Thomas Hunt Morgan School of Biological Sciences, Lexington, MA.
Toxicity of Organic Chemicals to Embryo-Larval Stages of Fish.
Final rept. Oct 76-Feb 79,
Wesley J. Birge, Jeffrey A. Black, and Donald M. Bruser. Jun 79, 72p EPA/560/11-79/007
Contract EPA-68-01-4321

A continuous flow procedure was developed for evaluating effects of insoluble and volatile organics on embryo-larval stages of fish. Test compounds were selected for different combinations of solubility and volatility and included aniline, atrazine, chlorobenzene, chloroform, 2,4-dichlorophenol, 2,4-dichlorophenoxyacetic acid, dioctyl phthalate, malathion, trisodium nitrilotriacetic acid, phenol, and polychlorinated biphenyl (Capacitor 21). A closed system devoid of standing air space greatly reduced volatility as a test variable. Mechanical homogenization proved highly effective in suspending hydrophobic compounds in influent water. Continuous agitation in the test chamber and regulation of detention time further precluded the need for carrier solvents. Test results indicated good reproducibility of exposure concentrations.

The most toxic compounds included Capacitor 21, chlorobenzene, 2,4-dichlorophenol, and phenol. Chlorobenzene at 90 micrograms/l produced complete lethality of trout eggs. The three other compounds gave log profit LC50's of 2 to 70 micrograms/l when trout stages were exposed in hard water, and LC1's were 0.3, 1.0, and 1.7 micrograms/l for phenol, Capacitor 21, and 2,4-dichlorophenol. Chloroform also was highly toxic to trout stages and LC1's ranged from 4.9 to 6.2 micrograms/l. When bass and goldfish stages were exposed to chlorobenzene, LC1's ranged from 8 to 33 micrograms/l. Compared to other species, trout developmental stages generally exhibited the greatest sensitivity. The LC1 values determined in embryo-larval tests compared closely with maximum acceptable toxicant concentrations developed in life-cycle studies. Most compounds produced appreciable frequencies of teratic larvae.

PB80-102197 PC **A03**/MF **A01**
Johns Hopkins Univ., Baltimore, MD. School of Medicine.
Evaluation of Purified Cholera Toxins and Toxoids as Immunizing Agents Against Cholera and Investigations of the Mechanisms by Which Antitoxin Immunity Provides Protection Against Cholera.
Final rept. 2 Oct 77-15 Feb 79,
Nathaniel F. Pierce. 31 Mar 79, 29p DAB-VDP-01-86
Contract N01-AI-0-2051
See also PB-292 294.

Dogs were immunized parenterally with the field-trial lot of cholera toxoid made by Wellcome Laboratories. Significant protection against experimental cholera lasted four months. This toxoid appeared somewhat more protective than the earlier Wyeth field-trail toxoid. Dogs immunized with the Wellcome toxoid plus killed vibrio cholerae appeared to have less protection. Oral immunization of dogs with crude or pure cholera toxin provoked striking mucosal antitoxic responses, protection against toxin-induced diarrhea and protection against oral challenge with V. cholerae. Significant protection occurred after two oral doses; three doses gave complete protection. Protection appeared largely due to locally produced antitoxin. Oral immunization with cholera toxin is vastly more effective than with inactivated toxoid; this may provide the basis for a practical approach to oral immunization of humans.

PB80-102262 PC **A07**/MF **A01**
IIT Research Inst., Chicago, IL.
Methodology for Estimating Direct Exposure to New Chemical Substances.
Final rept. Feb 79-Jun 79,
David Becker, Edward Fochtman, Allan Gray, and Thomas Jacobius. Jul 79, 140p IITRI-C6390-C08, EPA/560/13-79/008
Contract EPA-68-02-2617

The Toxic Substances Control Act (TSCA) requires each person who intends to manufacture a new chemical to submit a Premanufacturing Notice to the EPA at least 90 days before manufacture commences. The work reported was directed toward the development of a procedure for the orderly and rapid prediction of direct human exposure which might result from such manufacture. The procedure developed involves the following steps: (1) prediction of unavailable physical and chemical properties from analogs and general chemical knowledge, (2) prediction of production volume based upon company size, current markets and total market volume, (3) prediction of chemical operator exposure and exposures in the vicinity of the plant based upon fugitive emissions and (4) prediction of consumer exposure based upon active use and passive use of the chemical. The procedure will permit rapid screening however further refinements will enhance the usefulness.

7. CHEMISTRY

7A. Chemical Engineering

BNL-51011 PC **A03**/MF **A01**
Brookhaven National Lab., Upton, NY.
Alternative Process Schemes for Coal Conversion. Progress Report No. 1, October 1, 1978--January 31, 1979.
M. J. Sansone. Feb 79, 36p
Contract EY-76-C-02-0016

On the basis of simple, first approximation calculations, it has been shown that catalytic gasification and hydrogasification are inherently superior to conventional gasification with respect to carbon utilization and thermal efficiency. However, most processes which are directed toward the production of substitute natural gas (SNG) by direct combination of coal with steam at low temperatures (catalytic processes) or with hydrogen (hydrogasification) will require a step for separation of product SNG from a recycle stream. The success or falure of the process could well depend upon the economics of this separation scheme. The energetics for the separation of mixtures of ideal gases has been considered in some detail. Minimum energies for complete separation of representative effluent mixtures have been calculated as well as energies for separation into product and recycle streams. The gas mixtures include binary systems of H sub 2 and CH sub 4 and ternary mixtures of H sub 2 , CH sub 4 , and CO. A brief summary of a number of different real separation schemes has also been included. We have arbitrarily divided these into five categories: liquefaction, absorption, adsorption, chemical, and diffusional methods. These separation methods will be screened and the more promising methods examined in more detail in later reports. Finally, a brief mention of alternative coal conversion processes concludes this report. (ERA citation 04:049434)

CONF-7811122-1 PC **A03**/MF **A01**
Institute of Gas Technology, Chicago, IL.
IGT HYTORT Process for Hydrogen Retorting of Devonian Oil Shales.
S. A. Weil, H. L. Feldkirchner, D. V. Punwani, and J. C. Janka. 1978, 37p
Contract W-7405-ENG-26
Chattanooga shale conference, Oak Ridge, TN, USA, 14 Nov 1978.

Until recently, many shales were considered unsatisfactory feedstocks because of their relatively low oil yields in the Fischer Assay test and in conventional thermal retorting. In many instances - most notably in the case of Devonian marine shales of the eastern United States - Fischer Assay oil yields, per unit weight percent of organic shale content, have been less than half of those obtained from the more familiar but less abundant Eocene lacustrine shales of the Green River area of Colorado, Utah, and Wyoming. This strongly suggests that yield differences are related to the chemistry of the specific kerogen being retorted, and in particular to its hydrogen content. IGT work has shown that elemental hydrogen can react with kerogen to enhance the yield of shale oil and hydrocarbon gases obtained by retorting. This work led to the HYTORT concept for the production of syncrude and gas. Utilizing Eastern US Devonian oil shale feedstocks, organic carbon recoveries as high as 90% have been achieved in thermobalance tests, and as high as 85% in bench-scale tests; this compares with a conversion level of only about 35% using eastern shale feedstocks and conventional retorting. Preliminary economic analyses indicate that HYTORT can produce syncrude from low-grade eastern Devonian shales competitively with TOSCO and Paraho processing of higher-grade Colorado shales. (ERA citation 04:049504)

CONF-790415-36 PC **A03**/MF **A01**
Argonne National Lab., IL.
Extraction of DBP and MBP from Actinides: Application to the Recovery of Actinides from TBP--Na sub 2 CO sub 3 Scrub Solutions.
E. P. Horwitz, G. W. Mason, C. A. A. Bloomquist, R. A. Leonard, and G. J. Bernstein. 1979, 41p
Contract W-31-109-ENG-38
177. national meeting of the American Chemical Society, Honolulu, HI, USA, 1 Apr 1979.

A flowsheet for the recovery of actinides from TBP--Na sub 2 CO sub 3 scrub waste solutions has been developed, based on batch extraction data, and tested, using laboratory scale counter-current extraction techniques. The process utilizes 2-ethyl-1-hexanol (2-EHOH) to extract the TBP degradation products (HDBP and H sub 2 MBP) from acidified Na sub 2 CO sub 3 scrub waste leaving the actinides in the aqueous phase. Dibutyl and monobutyl phosphoric acids are attached to the 2-EHOH molecules through hydrogen bonds. These hydrogen bonds also diminish the ability of the HDBP and H sub 2 MBP to complex actinides and thus all actinides remain in the aqueous raffinate. Dilute sodium hydroxide solutions can be used to back-extract the dibutyl and monobutyl phosphoric acid esters as their sodium salts. The 2-EHOH can then be recycled. After extraction of the acidified carbonate waste with 2-EHOH, the actinides may be readily extracted from the raffinate with DHDECMP or, in the case of tetra- and hexavalent actinides, with TBP. The alcohol extraction (ARALEX) process is relatively simple and involves inexpensive and readily available chemicals. The ARALEX process can also be applied to other actinide waste streams which contain appreciable concentrations of polar organic compounds that interfere with conventional actinide ion exchange and liquid--liquid extraction procedures. (ERA citation 04:050413)

COO-4553-1 PC **A03**/MF **A01**
National Steel Corp., Pittsburgh, PA.
Dry Coke Quenching Study. Final Report, September 1978.
Sep 78, 27p
Contract EC-77-C-02-4553

The financial evaluation of capital and operating cost estimates for a dry coke quenching facility installation indicates a marginal return on investment if the evaluation is based exclusively on steam credits. However, the potential improvements in environmental emissions and reported, but unverified, blast furnace operations may justify the expenditure. The Russian and Japanese claim of 2 to 4% reduction in blast furnace coke usage with up to 4% increase in iron production has not been demonstrated in the domestic steel industry and, therefore, is not included in the financial analysis. A 2% coke reduction represents a savings of approximately $0.81 per ton of hot metal produced or an additional annual credit of $1,800,000 for dry coke quenching, exclusive of productivity gains. Additional credit of this magnitude would increase the estimated discounted cash flow return from 10% to approximately 16% for the estimated capital expenditure of $21,742,652. The projected world escalation in fuel cost, National conservation goals, possible energy supply shortages, and environmental considerations in conjunction with the need for a full scale, controlled test of dry quenched coke in a dedicated blast furnace are decisive factors in considering the merits of this proposal. National Steel Corporation is prepared to cooperate in the development and implementation of this program. (ERA citation 04:049431)

COO-4717-2 PC **A04**/MF **A01**
Texas A and M Univ., College Station. Dept. of Chemical Engineering.
Catalytic Conversion of Oxygenated Compounds to Low Molecular Weight Olefins. Annual Report for January 1--December 31, 1978.
R. G. Anthony. Jan 79, 72p
Contract EW-78-S-02-4717

The conversion of methanol or synthesis gas is an attractive route for producing ethylene and propylene from coal. Utilizing a chabazite ion exchanged with ammonium and rare earth chlorides, methanol is converted to ethylene, propylene, and propane with carbon yields of 70 to 90% at reaction temperatures of 360 to 450 exp 0 C and pressures from 1 to 18 atmospheres. Carbon disulfide in the feed at concentrations less than 2000 ppm increases the operating time between regenerations from four hours to twenty hours. At carbon disulfide concentrations of 3000 ppm or greater, the catalyst goes through three stages. The first is that of a dehydrogenation catalyst that produces carbon monoxide and hydrogen. The second stage produces ethylene and propylene, and finally, the third stage is a dehydration catalyst that produces dimethyl ether. Water has no detrimental effect on the catalyst, and appears to enhance its activity. Increase in pressure increases the production of propylene and propane at the expense of ethylene. X-ray diffraction studies show the formation of an ultrastable zeolite. No permanent deactivation was observed even though the catalyst was overheated once, and had been deactivated and regenerated for as many as 21 times. Ethylene yields increase as the temperature increases from

360 to 450 exp 0 C. When synthesis gas is passed over the catalyst at pressures equal to or less than 500 psi, methane and carbon dioxide are produced. (ERA citation 04:049454)

FE-1220-39(V.2) PC **A08**/MF **A01**
USS Engineers and Consultants, Inc., Pittsburgh, PA.
Clean Coke Process: Process Development Studies. Final Report. Volume II: Summary of PDU Studies.
Nov 78, 170p
Contract EX-76-C-01-1220

The PDU program included studies on carbonization and hydrogenation of coal and production of a pelletized formcoke from process char and binders based on SRC-I product. Carbonization procedures generally entailed preoxidation at 350 to 400 exp 0 F to reduce agglomeration characteristics, followed by two stages of carbonization, at 820 and 1400 exp 0 F, and at a pressure of 165 psia. For the Pittsburgh coal, preoxidation and first-stage carbonization were combined as one operation at 840 exp 0 F and with an oxygen-containing gas for fluidization treatment. Chars with sulfur contents as low as 0.2% were produced. Typical product yields from carbonization, based on dry coal feed, were as follows (wt %): char, 63; tar, 13; fuel gas, 8; acid gas, 11; and water, 5. Unbeneficiated Illinois coal was hydrogenated noncatalytically at a temperature of 840 to 880 exp 0 F and pressure of 3000 psig. The hydrogenator effluent was processed through a vapor stripper whereby a solids-free overhead was obtained, together with a solids--laden bottoms product. Pelletized formcoke was produced from carbonization char and a binder consisting of SRC-I product that was fluxed with process oils to produce a workable softening-point product, on the order of 140 to 170 exp 0 F. The binders were upgraded by a treatment schedule comprising airblowing and thermal soaking, both at elevated temperatures. Pellets made from a green mix containing about 30% of the treated binder, and that were processed through the curing and calcining cycles to produce a low-volatile-matter product, had a crushing strength greater than 700 pounds and ASTM stability and hardness values of about 56 and 73, respectively. A material balance showed 78% recovery of formcoke from the green pellets. (ERA citation 04:049432)

FE-1220-39(V.3)(Pt.2) PC **A03**/MF **A01**
USS Engineers and Consultants, Inc., Pittsburgh, PA.
Clean Coke Process: Process Development Studies. Final Report, Volume III-Final Process Design and Economics. Part 2: Process Economics.
Dec 78, 39p
Contract EX-76-C-01-1220

An economic analysis was made of a Clean Coke facility designed to process 12.43 million tons per year of Illinois No. 6 coal. The product list included 3.6 million tons per year of formcoke pellets, 1.5 million tons of chemical products, and more than 33 trillion Btu of liquid fuel. With a total investment of $1.75 billion and with coke, chemicals, and fuels priced at $150 per ton, $256 per ton (average), and $2.50 per million Btu, respectively, a 14 percent return on investment was projected. By replacing Clean Coke hydrogenation with an SRC process variation and producing briquettes instead of pellets, the plant investment was reduced by $130 million, and the net result was an improvement in profitability, to a projected return of better than 15 percent. A final case involving production mainly of briquetted coke and fuels entailed a further $140 million reduction in plant investment. However, a revenue decrease of 22 percent over either of the other two cases resulted in significantly reduced profitability. Further analysis of the plant economics indicated that process profitability is particularly sensitive to coke value and that a price of $150 per ton is required under virtually all conditions and modifications to generate a minimum 15 percent return on the investment. (ERA citation 04:048040)

FE-2032-9 PC **A04**/MF **A01**
Catalysts and Chemicals, Inc., Louisville, KY.
Sulfur Resistant Methanation Catalyst. Final Report, July 1, 1975--January 31, 1978.
A. L. Hausberger, and W. A. Kustes. 20 Apr 78, 73p
Contract EX-76-C-01-2032

The purpose of this work was to develop a catalyst which would methanate a gasified-coal stream without prior sulfur removal. Fifty-eight activity tests have been completed on forty-nine different catalyst compositions which were studied as sulfur-resistant methanation catalysts. Most of the base-metal catalytically-active, transition elements were used to prepare the catalysts. These metals were combined or used singly with carriers such as alumina, silica, chromium oxide, magnesium oxide, magnesium silicate, and magnesium aluminate to provide the test catalysts for this work. In addition, a number of catalysts of identical chemical composition were prepared by several formulation methods. Test conditions, including temperature, gas composition, and steam levels were varied during the course of the work and computer data processing was used to analyze the test results. Two catalysts, namely nickel and chromium on magnesium silicate and nickel and chromium on magnesium aluminate, converted all of the carbon monoxide and part of the carbon dioxide to methane at 500 exp 0 F when reduced with only hydrogen and no sulfur in the process gas. This is equivalent to the performance of nickel-SNG type methanation catalysts. After sulfiding, the nickel--chromium on magnesium silicate catalyst retained a 60 to 80% methanation activity at 1100 exp 0 F with low steam/gas ratios. It is important to note that 60 to 80% methanation activity has only been achieved when testing at 1100 exp 0 F. The final stages of a multiple reactor system usually operate at lower temperatures, 500 to 700 exp 0 F, where the equilibrium for the methanation reaction is more favorable, resulting in minimal carbon monoxide and hydrogen contamination of the product methane. Since a low temperature activity in the presence of sulfur was not obtained, it was recommended this research be abandoned. (ERA citation 04:049435)

FE-2047-10 PC **A07**/MF **A01**
Colorado School of Mines, Golden. Dept. of Chemical and Petroleum Refining Engineering.
Clean Solid and Liquid Fuels from Coal. Quarterly Progress Report, July--September 1978.
J. H. Gary, J. O. Golden, R. L. Bain, and D. W. Dickerhoof, Nov 78, 137p
Contract EX-76-C-01-2047

In the area of continuous coal conversion efforts were mainly devoted to data reduction and analysis of the kinetic experiments with the CSM continuous unit operating in a stirred tank reactor mode. Preliminary analysis of yield as a function of temperature and reactor residence time is presented. Modifications were made to the system to improve operation of the unit when performing experiments in a tubular reactor mode; these included moving the preheater to a vertical orientation and adding a pressurization line to the sampling system to decrease system pressure upsets during sampling. A series of seven runs were made to test this system operation. A summary of an ancillary study to investigate the effects of mineral matter, gaseous hydrogen, and residence time upon the conversion of a HVA bituminous coal is presented. In general, the results are complicated by interactions between the individual changes caused by each variable. The results do show that the conversion is affected by all of the above mentioned variables; and that investigations of mineral matter effects should continue. The major portion of the catalytic hydrodenitrogenation study was compiled. A Ni--Mo catalyst was used to perform hydrodenitrogenation experiments on a steady-state recycle oil from the Fort Lewis SRC plant. Kinetic models have been developed to represent the rate of nitrogen removal. Nitrogen removal can be modelled by either a global second order equation or by a global, parallel first-order reaction sequence. The rate of disappearance of carbazole has also been modelled as a first-order reaction. Reaction rate constants and Arrhenius activation energies for the above kinetic models are presented. (ERA citation 04:048062)

FE-2247-21 PC **A02**/MF **A01**
Texaco, Inc., South El Monte, CA. Montebello Research Lab.
Gasification of Residual Materials from Coal Liquefaction. Evaluation of SRC II Vacuum Flash Drum Bottoms from Powhatan Coal as a Feedstock for the Texaco Gasification Processes.
A. M. Robin. Mar 79, 10p
Contract EX-76-C-01-2247

A laboratory evaluation of a 20-pound sample of Vacuum Flash Drum Bottoms from the SRC II Plant at Ft. Lewis, Washington was completed. The sample, which was obtained from the liquefaction of Powhatan coal, was judged to be a suitable feedstock for the Texaco Synthesis Gas Generation Process. It can be charged directly to the gasifier at a temperature of about 615 exp 0 F. The material is too viscous to be pumped with the pilot plant equipment, however, which is capable of maintaining a temperature of only 515 exp 0 F. The addition of 3 to 5 percent cutter will be required for the pilot plant tests. No cutter will be required for a commercial plant. Based on these results, operating conditons and yields were estimated for gasifying 1000 pounds per hour of molten undiluted residue at 350 psig. A Type II preliminary pilot plant evaluation is planned. (ERA citation 04:049437)

FE-2276-27 PC **A17**/MF **A01**
Mobil Research and Development Corp., Paulsboro, NJ.
Development Studies on Selected Conversion of Synthesis Gas from Coal to High Octane Gasoline. Final Report.
J. A. Brennan. Oct 78, 382p
Contract EX-76-C-01-2276

An exploratory, experimental process study was conducted on the direct conversion of coal derived synthesis gas to gasoline. Novel, proprietary catalysts, supplied by Mobil Research and Development Corporation were used. These unique catalysts do not yield oxygenates and the hydrocarbons formed are limited in size to about C sub 11. Consequently, both gasoline selectivity and quality exceeds that of the gasoline produced in the Fischer--Tropsch process. This new technology was compared with conventional Fischer--Tropsch. The experiments were conducted in micro reactor (10 cc catalyst capacity) and in bench-scale units (150 cc catalyst capacity). The bench-scale unit was used in both a fixed and fluid bed mode. The studies included effects of temperature, pressure and space velocity on catalyst performance, and catalyst activation, aging and regeneration. Theoretical studies were made to support the process research. Mobil Research and Development Corporation has discovered a series of catalysts that will convert coal-derived synthesis gas to high octane number gasoline in selectivities higher than predicted by the Schultz--Flory equation. The process potential of these catalysts was assessed under Contract No. EX-76-C-01-2276, jointly funded by DOE and Mobil Research and Development Corp. (ERA citation 04:048045)

FE-2434-37 PC **A03**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Pipeline Gas from Coal - Hydrogenation (IGT Hydrogasification Process). Project 9000 Quarterly Report No. 9, July 1--September 30, 1978.
Mar 79, 42p
Contract EX-76-C-01-2434

The objective of this project is to perform the necessary pilot plant operations and related support studies to acquire data for a commercial/demonstration plant design based on the HYGAS Process. To this end, tests are being conducted with Illinois bituminous coal to acquire data for optimizing the process. In Test 74 the new steam--oxygen gas distributor and the fluidizing steam distributor were tested in the steam--oxygen gasifier for their effects on its operation. Temperature measurements below the steam--oxygen distributor indicate that at higher steam feeds to the fluidizing steam distributor, solids mixing was significantly improved. Twenty-one days of continuous self-sustained operation were logged, breaking all previous records and accumulating over 200 hours of steady-state operation. The entire HYGAS pilot plant was inspected following Test 74. Immediately after Test 74, the reactor and related piping and vessels were successfully pressure-tested at 1000 pounds as a preliminary procedure for Test 75 high-pressure operations. Additional data were supplied to Procon, Inc., to aid in its design of a commercial/demonstration HYGAS plant. Work continued on the cold-flow model of the upper stage of the HYGAS reactor, details of which are presented. Pretreater and gasifier material balances and engineering data from Test 70 are also included. (ERA citation 04:048046)

FE-2496-34 PC **A04**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA.
Operation of a Sampling Train for the Analysis of Environmental Species in Coal Gasification Gas-Phase Process Streams.
M. J. Pochan, and M. J. Massey. Feb 79, 56p
Contract EX-76-S-01-2496

This report discusses the results of actual raw product gas sampling efforts and includes: Rationale for raw product gas sampling efforts; design and operation of the CMU gas sampling train; development and analysis of a sampling train data base; and conclusions and future application of results. The results of sampling activities at the CO sub 2 -Acceptor and Hygas pilot plants proved that: The CMU gas sampling train is a valid instrument for characterization of environmental parameters in coal gasification gas-phase process streams; depending on the particular process configuration, the CMU gas sampling train can reduce gasifier effluent characterization activity to a single location in the raw product gas line; and in contrast to the slower operation of the EPA SASS Train, CMU's gas sampling train can collect representative effluent data at a rapid rate (approx. 2 points per hour) consistent with the rate of change of process variables, and thus function as a tool for process engineering-oriented analysis of environmental characteristics. (ERA citation 04:048047)

FE-2514-M2 PC **A04**/MF **A01**
Lummus Co., Bloomfield, NJ.
Developmental Research Program for Clean Industrial and Transportation Fuels from Coal.
H. D. Schindler, and R. H. Long. Feb 79, 65p
Contract EF-76-C-01-2514

The integrated coal liquefaction facility was operated to first demonstrate solvent self-sufficiency on equilibrium paste solvent. A coal paste consisting of 70 weight percent hydrogenated start-up paste oil and 30 weight percent coal was used to generate an initial solvent inventory. This paste oil pool was then used for all subsequent operations. Solvent self-sufficiency on equilibrium solvent as monitored by a combination of elemental analyses, physical properties, analytical distillations, and spectrophotometric measurements was demonstrated. With equilibrium paste solvent available, a catalyst life study was initiated and completed. Operations on catalyst life testing were concluded at the request of DOE at a coal throughput of 1,567 pounds of coal per pound of catalysts. The sulfur, nitrogen, and ash results for operations at a throughput of just over 1200 pounds of coal per pound of catalyst are listed. When employing a catalyst replacement mode of operation, the projected results indicate that a nitrogen level of 0.5 weight percent would permit the processing of 1,653 pounds of coal per pound of catalyst equivalent to a catalyst consumption of 1.21 pounds of catalyst per ton of coal. Nitrogen levels are controlling, since a sulfur level of 0.3 weight percent (with catalyst replacement) would permit a throughput of 6,010 pounds of coal per pound of catalyst - a catalyst consumption of 0.33 pounds per ton of coal. Confirming the anticipated benefits of operating the hydroliquefaction reactors in a manner approaching plug flow, the hydrogen consumptions during the catalyst life study period ranged from 2.3 to 3.1 weight percent on coal for the yield structures reported herein. (ERA citation 04:049451)

FE-2778-4 PC **A04**/MF **A01**
Pullman Kellogg, Houston, TX.
Engineering Support Services for the DOE/GRI Coal Gasification Research Program. Quarterly Technical Progress Report, October--December 1978.
A. E. Cover. Jan 79, 52p
Contract ET-78-C-01-2778

The objective of this contract is to provide engineering support services to the Department of Energy/Gas Research Institute in the high Btu coal gasification research program. The gasification research program is to determine the specific process and/or combination of component processing steps that offer the greatest economic potential for commercial application. Kellogg has assembled a task team and formulated plans for managing this program so that Kellogg can be quickly responsive to the needs of the Department of Energy/Gas Research Institute (DOE/GRI) and the program contractors. Kellogg has visited all of the Pilot Plants and Process Development Units (PDUs) presently involved in the DOE/GRI high-Btu coal gasification programs. Monitoring and evaluation activities have begun with recent tests at the Hygas and BI-GAS pilot plants and the Westinghouse PDU. A metallurgist has been assigned to follow the activities of the Metal Properties Council in materials testing in the coal gasification environment. (ERA citation 04:049439)

GA-A-15371 PC **A06**/MF **A01**
General Atomic Co., San Diego, CA.
Study of Chemical Production Utilizing Fusion Neutrons. Progress Report, March--September 1978.
L Rovner, R. Goodrich, and B. Jensen. Apr 79, 121p

Chapters are devoted to the characteristics of fusion energy (heat utilization and tritium breeding characteristics), thermal spike chemistry, high-temperature thermochemical water splitting (General Atomic sulfur/iodine cycle, magnetite/wistite cycle, sodium ferrate cycle, and calcium iodate cycle), and thermal fixation of nitrogen from air. (ERA citation 04:048252)

HCP/J6639-01 PC **A16**/MF **A01**
Katzen (Raphael) Associates, Cincinnati, OH.
Grain Motor Fuel Alcohol Technical and Economic Assessment Study.
Jun 79, 368p
Contract EJ-78-C-01-6639

This study evaluates the technical and economical feasibility for production of motor-fuel alcohol from a plant with a capacity of 50 million US gallons per year. The evaluation includes a detailed process design using proven technology, a complete budget estimate of the plant investment including working capital, a detailed analysis of the annual operating cost using corn as the primary feedstock, and a complete financial analysis which establishes the alcohol selling price required to net to the investor a 15% discounted cash flow - interest rate of return. This is called the base case evaluation. In addition, other considerations for production of motor-fuel alcohol were evaluated and are discussed here, namely: excursions on plant capacities; excursions on feedstock material; sensitivity analyses on financial parameters; and substitution of corn stover for coal as the fuel source. The report also includes an assessment and commentary on the agricultural, technological, and economic impact of a major gasohol program in the US. (ERA citation 04:048260)

PERC-0058-33 PC **A03**/MF **A01**
Lummus Co., Bloomfield, NJ.
Hot and Dry Char Letdown System for the SYNTHANE Pilot Plant. Phase III. Activities: Brief Final Report.
31 Dec 78, 45p
Contract EY-76-C-02-0058

In the SYNTHANE gasification process a carbonaceous combustible char having a heating value of 9000--10,000 Btu/lb is produced as a by-product (approximately 0.3 pound per pound of coal feed). To render the SYNTHANE process energy effective it is important that the energy available in this char be recovered since it represents a significant proportion of the available energy in the coal. The char exits the gasifier at temperatures up to 1800 exp 0 F and pressures to 1000 psig. At these conditions the char contains a substantial amount of energy available as sensible heat. In the demonstration plant no attempt has been made to recover either the heating value or the sensible heat of the char. The char is simply cooled by water quench, depressurized, filtered, and disposed of as a wet filter cake. In a commercial plant means for recovering this energy must be provided. Initial planning indicated the most expedient method of heat recovery was dry depressurization of the char stream to essentially atmospheric pressure followed by combustion in a conventional boiler. To maximize the heat recovery and to assist combustion it is desirable to maintain the char temperature entering the boiler as high as possible. In June 1975, The Lummus Company was awarded a contract which provided for the design, simulation testing, and fabrication of a commercially scaleable system to discharge hot dry char from the Bruceton gasifier and theoretically be compatible with a downstream heat recovery boiler. This report covers Phase III activities for the period ending on December 31, 1978, the contract expiration date. The Phase III effort, had the contract been extended beyond the expiration date, would have required the design, fabrication and delivery of four nozzle cascade units and the required auxiliary equipment suitable for use in the SYNTHANE pilot plant. Phase III was not carried to completion because funding for the Synthane Pilot Plant was terminated. (ERA citation 04:048053)

7C. Organic Chemistry

AD-A073 934/2 Not available NTIS
Kansas State Univ Manhattan Dept of Chemistry
A Facile Synthesis of 1,1-Bis(Fluoroxy)Perfluoroethane,
A. Sekiya, and D. D. DesMarteau. 7 Oct 78, 2p
ARO-14339.2-C
Grant DAAG29-77-G-0071
Availability: Pub. in Inorganic and Nuclear Chemistry Letters, v15 p203-204 1979 (No copies furnished by DDC).

No abstract available.

AD-A074 277/5 Not available NTIS
Kansas State Univ Manhattan Dept of Chemistry
Reaction of Metal Fluorides with CF3OOCF2N(H)CF3,
Akira Sekiya, and Darryl D. DesMarteau. 31 Aug 78, 2p ARO-14339.8-C
Grant DAAG29-77-G-0071
Availability: Pub. in Inorganic Chemistry, v18 n4 p919-920 1979. (No copies furnished by DDC).

No abstract available.

PAT-APPL-6-054 501 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Improved Synthesis of Polyformals.
Patent Application,
A. C. Poshkus. Filed 3 Jul 79, 9p N79-30376/4, NASA-CASE-ARC-11244-1
Subm-Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Formals of CH2OH(CHOH)nCH2 polyols (n = 2 to 4) are prepared in less than 15 minutes by heating to about 125 C, a mixture of e.g. sorbitol and paraformaldehyde in slight excess (5 to 10%), in the presence of e.g. sulfuric acid in catalytic quantities. Elution with methanol and filtration yield the pure solid cyclic triformal. The process can be carried in stages, using most stoichiometric quantities of paraformaldehyde, but without any change in overall heating time.

PAT-APPL-6-054 502 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
An Improved Synthesis of 2, 4, 8, 10-Textroxaspiro (5.5)Undecane.
Patent Application,
A. C. Poshkus. Filed 3 Jul 79, 12p N79-30375/6, NASA-CASE-ARC-11243-1
Subm-Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Pentaery thritol is converted to its diformal, 2,4,8,10-tetrox aspiro (5.5) undecane, by heating it to a temperature within the range of about 110 to 150 C for a period of up to 10 minutes, in the presence of a slight excess of paraformaldehyde and of a catalytic quantity of an acid catalyst such as sulfuric acid. The reaction is carried out in two steps, by forming first the monoformal, then the diformal. The total reaction time is about 10 minutes and yield of diformal are greater than 90%.

7D. Physical Chemistry

AD-A073 851/8 PC **A06**/MF **A01**
Wisconsin Univ-Madison Dept of Physics

Molecular Reaction Rates.
Final rept. 1 Aug 73-30 Sep 78,
Chun C. Lin, and Sunggi Chung. 30 Oct 78, 115p AFGL-TR-78-0262
Contract F19628-73-C-0274

Theoretical excitation/dissociation cross sections of H2 molecule by electron impact have been calculated by Born approximation and by the method of close-coupling. The ab initio calculations have been facilitated by using the Gaussian-type orbital technique. In the case of dissociation of O2 via the Schumann-Runge system, the theoretical calculations are based on the multiconfiguration self-consistent-field wave functions. (Author)

AD-A073 864/1 PC A02/MF A01
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
Observation of Subnatural Linewidths by Two-Step Resonant Scattering in I2 Vapor,
Richard P. Hackel, and Shaoul Ezekiel. 26 Feb 79, 5p
Contract DAAG29-78-C-0020, Grant NSF-PHY77-07156
Pub. in Physical Review Letters, v42 n26 p1736-1739, 25 Jun 79.

No abstract available.

AD-A073 865/8 PC A02/MF A01
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
High Resolution X-Ray and Light Scattering Studies of the Bilayer Smectic A Compounds,
J. D. Litster, J. Als-Nielsen, R. J. Birgeneau, S. S. Dana, and D. Davidov. Apr 79, 7p
Contract DAAB07-76-C-1400, Grant NSF-DMR76-18035
Pub. in Jnl. de Physique, v40 p4 pC3-399--C3-344 Apr 79.

No abstract available.

AD-A073 866/6 PC A02/MF A01
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
X-Ray Scattering Study of the Commensurate-Incommensurate Transition of Monolayer Krypton on Graphite,
P. W. Stephens, P. Heiney, R. J. Birgeneau, and P. M. Horn. 10 Apr 79, 6p
Contract DAAG29-78-C-0020
Pub. in Physical Review Letters, v43 n1 p47-51, 2 Jul 79.

No abstract available.

AD-A073 882/3 PC A02/MF A01
Massachusetts Inst of Tech Lexington Lincoln Lab
Alkali-Metal Resonance-Line Lasers Based on Photodissociation.
Journal article,
Daniel J. Ehrlich, and Richard M. Osgood. 10 Jan 79, 5p JA-4891, ESD-TR-79-172
Contract F19628-78-C-0002
Pub. in Applied Physics Letters, v34 n10 p655-658, 15 May 79.

No abstract available.

AD-A073 907/8 Not available NTIS
Northwestern Univ Evanston IL Dept of Engineering Science and Applied Mathematics
The Exit Problem: A New Approach to Diffusion Across Potential Barriers,
Zeev Schuss, and Bernard J. Matkowsky. 12 Dec 77, 21p ARO-15486.8-M
Grant DAAG29-77-G-0222, Contract AFOSR-78-3602
Availability: Pub. in SIAM Jnl. of Applied Mathematics, v35 n3 p604-623 Jun 79. (No copies furnished by DDC).

No abstract available.

AD-A073 909/4 Not available NTIS
Ohio State Univ Columbus Electroscience Lab
Effects of Oxygen Addition on Pressure-Broadened Water-Vapor Absorption in the 10-Micrometer region,
R. J. Nordstrom, M. E. Thomas, J. C. Peterson, E. K. Damon, and R. K. Long. 18 Feb 78, 6p ARO-14702.2-GS
Availability: Pub. in Applied Optics, v17 n17 p2724-2729, 1 Sep 78 (No copies furnished by DDC).

No abstract available.

AD-A073 910/2 Not available NTIS
Ohio State Univ Columbus Electroscience Lab
Water Vapor-Nitrogen Absorption at CO2 Laser Frequencies.
J. C. Peterson, M. E. Thomas, R. J. Nordstrom, E. K. Damon, and R. K. Long. 28 Sep 78, 8p ARO-14702.3-GS
Contract DAAG29-77-C-0010
Availability: Pub. in Applied Optics, v18 n6 p834-841, 15 Mar 79. (No copies furnished by DDC).

No abstract available.

AD-A073 911/0 Not available NTIS
Pittsburgh Univ PA Dept of Physics and Astronomy
Molecular Resonance Phenomena,
J. N. Bardsley. 1979, 14p
Contract N00014-76-C-0098, Grant NSF-PHYS76-21456
Availability: Pub. in Electron-Molecule and Photon-Molecule Collisions, p267-280 1979. (No copies furnished by DDC).

No abstract available.

AD-A073 912/8 Not available NTIS
Columbia Radiation Lab New York
Total Scattering Cross Section for Na on He Measured by Stimulated Photon Echoes,
T. Mossberg, A. Flusberg, R. Kachru, and S. R. Hartmann. 5 Dec 78, 5p
Contracts DAAG29-77-C-0019, N00014-78-C-0517
Availability: Pub. in Physical Review Letters, v42 n25 p1665-1669, 18 Jun 79. (No copies furnished by DDC).

No abstract available.

AD-A073 913/6 Not available NTIS
Pittsburgh Univ PA Dept of Physics and Astronomy
Thermal-Energy Charge Transfer, Quenching, and Association Reactions of Doubly Charged Ions in the Rare Gases,
Rainer Johnsen, and Manfred A. Biondi. 29 Jan 79, 11p ARO-14656.4-P
Contract N00014-76-C-0098, Grant DAAG29-77-G-0079
Availability: Pub. in Physical Review A, v20 n1 p87-97 Jul 79 (No copies furnished by DDC).

No abstract available.

AD-A073 915/1 Not available NTIS
Columbia Radiation Lab New York
Foreign-Gas-Induced Relaxation of Rydberg S and D States in Atomic Sodium,
A. Flusberg, R. Kachru, T. Mossberg, and S. R. Hartmann. 18 Sep 78, 15p
Contracts DAAG29-77-C-0019, N00014-78-C-0517
Availability: Pub. in Physical Review A, v19 n4 p1607-1621 Apr 79. (No copies furnished by DDC).

No abstract available.

AD-A073 915/5 PC A02/MF A01
Indiana Univ at Bloomington Dept of Chemistry
Intriguing Aspects of 1,2-Dialkyl-Dimolybdenum and -Ditungsten (M Triple Bond M) Chemistry.
Technical rept.,
Malcolm H. Chisholm, and Deborah A. Haitko. 27 Aug 79, 13p Rept no. TR-79-4
Contract N00014-76-C-0826

The preparation of a series of 1,2-dialkyl compounds of dimolybdenum and ditungsten (M=M) having the general formula M2R2(NMe2)4 is reported for R = CH3, CH2CH3, CH2CD3, CH2CH2CH2CH3, CH(CH3)2, CH2C(CH3)3, CH2Si(CH3)3 and C(CH3)3. The isolation of the labelled compounds M2(CH2CD3)2(NMe2)4 and the isopropyl and tert-butyl derivatives implies that beta-hydrogen elimination is either kinetically or thermodynamically not favorable. All of the above react in hydrocarbon solutions with CO2.

AD-A073 932/6 Not available NTIS
Connecticut Univ Storrs
'Ab Initio' Calculations of the Electronic Properties of N4(-) in KN3,
Gary D. Bent, Ralph H. Bartram, Angelo R. Rossi, and Peter J. Kemmey. 17 Nov 77, 10p ARO-13262.8-P
Contract DAHC0475-G-0128
Availability: Pub. in Jnl. of Physics and Chemistry of Solids, v40 n7-A p493-502 1979. (No copies furnished by DDC).

No abstract available.

AD-A073 942/5 Not available NTIS
Northwestern Univ Evanston IL Dept of Physics and Astronomy
Investigation of Nematic Ordering Using Electric-Field-Induced Second-Harmonic Generation,
S. K. Saha, and George K. Wong. 31 Oct 78, 4p ARO-14280-2-P
Contract DAAG29-77-G-0009
Availability: Pub. in Applied Physics Letters, v34 n7 p423-425, 1 Apr 79 (No copies furnished by DDC).

No abstract available.

AD-A073 944/1 Not available NTIS
Houston Univ TX Dept of Chemistry
Macromolecular Ionic Clusters of Water Detected by SIMS,
Gerald M. Lancaster, Fumihiro Honda, Yasuo Fukuda, and J. Wayne Rabalais. 26 Jun 78, 4p ARO-14361.18-C
Grant DAAG29-77-G-0054
Availability: Pub. in International Jnl. of Mass Spectrometry and Ion Physics, v29 p199-202 1979. (No copies furnished by DDC).

No abstract available.

AD-A073 988/8 Not available NTIS
State Univ of New York at Stony Brook Dept of Chemistry
Polymer Diffusion in a Dilute Theta Solution. 1. Polystyrene in Cyclohexane,
Erdogan Gulari, Esin Gulari, Y. Tsunashima, and B. Chu. 20 Oct 78, 11p ARO-13245.9-C
Grant DAAG29-76-G-0005
Availability: Pub. in Polymer, v20 p347-355 Mar 79 (No copies furnished by DDC).

No abstract available.

AD-A073 992/0 Not available NTIS
Massachusetts Univ Amherst Dept of Chemistry
Tungsten(IV) Chelates-Potential Energy Transfer Complexes,
Ronald D. Archer, Craig J. Donahue, William H. Batschelet, and David R. Whitcomb. 22 Feb 78, 11p ARO-13583.10-CX
Grant DAAG29-76-G-0192
Availability: Pub. in Advances in Chemistry Series, n173 p252-262 1979. (No copies furnished by DDC).

No abstract available.

AD-A074 004/3 Not available NTIS
Connecticut Univ Storrs Dept of Physics
Inelastic Energy Loss: Newer Experimental Techniques and Molecular Orbital Theory,
Q. C. Kessel, E. Pollack, and W. W. Smith. 1978, 79p ARO-13400.8-P
Grant DAAG29-76-G-0130
Availability: Pub. in Collision Spectroscopy, ch3 p147-225 1978 (No copies furnished by DDC).

No abstract available.

AD-A074 007/6 Not available NTIS
California Univ Santa Barbara Dept of Chemistry
Dephosphorylation by Amidoximate,
Clifford A. Bunton, and Giorgio Cerichelli. 14 Nov 78, 2p ARO-15690.2-C
Grant DAAG29-78-G-0175
Availability: Pub. in Jnl. of Organic Chemistry, v44 n11 p1880-1881 1979 (No copies furnished by DDC).

No abstract available.

AD-A074 012/6 Not available NTIS
SRI International Menlo Park CA Molecular Physics Lab

Metastable Oxygen Emission Bands,
Tom G. Slanger. 5 Jun 78, 4p ARO-14708.1-C
Contracts DAAG29-77-C-0018, NASW-2849
Availability: Pub. in Science, v202 p751-753, 17 Nov 78. (No copies furnished by DDC).

No abstract available.

AD-A074 036/5 Not available NTIS
New York Univ NY Dept of Physics
Radiative Collisions with Impact Level Shifts,
E. J. Robinson. 13 Sep 78, 6p
Contract N00014-77-C-0553
Availability: Pub. in Jnl. of Physics B Atomic and Molecular Physics, v12 n9 p1451-1456 1979 (No copies furnished by DDC).

No abstract available.

AD-A074 037/3 Not available NTIS
New York Univ NY Dept of Physics
Theory of Collisionally Aided Radiative Excitation,
S. Yeh, and P. R. Berman. 18 Sep 78, 11p
Contracts N00014-77-C-0553, E(11-1)-3077
Availability: Pub. in Physical Review A, v19 n3 p1106-1116 Mar 79 (No copies furnished by DDC).

No abstract available.

AD-A074 040/7 Not available NTIS
Rice Univ Houston TX Dept of Chemistry
Co-Condensation Reactions of Uranium Tetrafluoride and Hexafluoride with Alkali Metals and Alkali-Metal Fluorides in Low-Temperature Argon Matrices,
Kenneth R. Kunze, Robert H. Hauge, Delphia Hamill, and John L. Margrave. 15 Apr 77, 9p
ARO-15258.6-C
Grant DAAG29-77-G-0169
Availability: Pub. in Jnl. of The Chemical Society, Dalton Transactions, p433-440 1978 (No copies furnished by DDC).

No abstract available.

AD-A074 042/3 Not available NTIS
Houston Univ TX Dept of Chemistry
Secondary Ion Mass Spectrometry of Molecular Solids. Cluster Formation during Ion Bombardment of Frozen Water, Benzene, and Cyclohexane,
Gerald M. Lancaster, Fumihiro Honda, Yasuo Fukuda, and J. W. Rabalais. 30 Aug 78, 8p ARO-14361.23-C
Grant DAAG29-77-G-0054
Availability: Pub. in Jnl. of the American Chemical Society, v101 n8 p1951-1958, 11 Apr 79 (No copies furnished by DDC).

No abstract available.

AD-A074 055/5 PC **A02**/MF **A01**
Colorado State Univ Fort Collins Dept of Chemistry
Two Photon Spectroscopy of Pyrazine and Triazine.
Technical rept.,
J. D. Webb, K. M. Swift, and E. R. Bernstein. Sep 79, 10p Rept no. TR-22
Contract N00014-75-C-1179

Two photon absorption spectra, detected by fluorescence, phosphorescence, and photoacoustic methods are presented for pyrazine and triazine. Vibronic assignments are made in both systems based on polarization and contour analysis. For pyrazine, origin intensity is observed which suggests the (B)(3U) state does not possess inversion symmetry. Linear, quadratic, and pseudo-Jahn Teller couplings are discussed for triazine. (Author)

AD-A074 058/9 Not available NTIS
Pennsylvania Univ Philadelphia Lab for Research on the Structure of Matter
Chemistry of Graphite Intercalation by Nitric Acid,
W. C. Forsman, F. L. Vogel, D. E. Carl, and Jeffrey Hoffman. 3 May 78, 3p ARO-15804.2-MS
Contract DAAG29-78-C-0037, Grant NSF-DMR76-00678
Availability: Pub. in Carbon, v16 n4 p269-271 1978 (No copies furnished by DDC).

No abstract available.

AD-A074 059/7 Not available NTIS
California Inst of Tech Pasadena Dept of Applied Mathematics
Interacting Oscillatory Chemical Reactors,
Donald S. Cohen, and John C. Neu. 1979, 7p
ARO-7625.47-M
Contract DAHC04-68-C-0006, Grant NSF-GP-32157
Availability: Pub. in Annals of the New York Academy of Sciences, v316 p332-337, 28 Feb 79 (No copies furnished by DDC).

No abstract available.

AD-A074 064/7 Not available NTIS
Rice Univ Houston TX Dept of Chemistry
A Study of Thermal Decomposition of the Solid-Layered Fluorocarbon, Poly(Carbon Monofluoride),
P. Kamarchik, Jr., and J. L. Margrave. 6 Jun 76, 12p ARO-15258.5-C
Grant DAAG29-77-G-0169
Availability: Pub. in Jnl. of Thermal Analysis, v11 p259-270 1977 (No copies furnished by DDC).

No abstract available.

AD-A074 089/4 PC **A02**/MF **A01**
Cornell Univ Ithaca NY Baker Lab
Kinetic Aspects of Gas Phase Metal Atom Oxidation Reactions.
Final rept. 1 Jun 76-31 May 79,
John Wiesenfeld. 31 Jul 79, 17p AFOSR-TR-79-0956
Grant AFOSR-76-3039

The oxidation of Ge and Sn by various gases including N2O, has been studied by flash photolysis at room temperature and the kinetics determined. The rate of Sn + N2O is probably too slow to permit construction of a chemical laser based on this reaction. A new set of techniques involving laser pumping of alkaline earth atoms is also described which will permit the study of the kinetic behavior of their low-lying excited levels in bimolecular collisions. (Author)

AD-A074 116/5 Not available NTIS
California Univ Berkeley Dept of Chemistry
Vibrational Relaxation of HF(v=3,4),
D. J. Douglas, and C. Bradley Moore. 15 May 78, 5p ARO-15131.10-P
Grant DAAG29-77-G-0200
Availability: Pub. in Chemical Physics Letters, v57 n4 p485-489, 15 Aug 78. (No copies furnished by DDC).

No abstract available.

AD-A074 119/9 Not available NTIS
Rice Univ Houston TX Dept of Chemistry
Matrix Isolation IR and EPR Studies of Reaction Intermediates: Lithium Atom Reactions with H2O, CH3OH, and NH3,
R. H. Hauge, P. F. Meier, and J. L. Margrave. 1978, 2p ARO-15258.4-C
Grant DAAG29-77-G-0169
Availability: Pub. in Berichte der Bunsengesellschaft fuer Physikalische Chemie, v82 p102-103 1978 (No copies furnished by DDC).

No abstract available.

AD-A074 120/7 Not available NTIS
California Inst of Tech Pasadena Arthur Amos Noyes Lab of Chemical Physics
Extraction of Vibronic Information from Tangled Spectra,
J. O. Berg. 31 Mar 76, 5p CONTRIB-5301, ARO-14470.2-C
Contract DAHC04-74-C-0010
Availability: Pub. in Chemical Physics Letters, v41 n3 p547-551, 1 Aug 76. (No copies furnished by DDC).

No abstract available.

AD-A074 163/7 PC **A03**/MF **A01**
Washington Univ Seattle Dept of Chemistry
Collisional Relaxation of Transient Vibrational Energy Distributions in a Thermal Unimolecular System. The Variable Encounter Method.
Technical rept.,
D. F. Kelley, L. Zalotai, and B. S. Rabinovitch. 15 Sep 79, 42p
Contract N00014-75-C-0690

The Variable Encounter Method is described in detail together with theoretical modes for deconvolution of data. A relation is developed between mean first passage time and 'incubation' time. Application is made to the study of the transient region in vibrational accommodation of cyclopropane-d2 at high temperature surfaces. Collision efficiency declines with rise of temperature. Surface collisions are more efficient than binary gas phase encounters. (Author)

AD-A074 177/7 PC **A03**/MF **A01**
Texas Tech Univ Lubbock Dept of Chemistry
Studies of HnFn Oligomeric Species.
Final rept. 1 Jun 78-31 May 79,
Richard L. Redington. 27 Jul 79, 40p AFOSR-TR-79-0950
Grant AFOSR-78-3616

Infrared matrix-isolation spectra of HF and HF/H2O mixtures suspended in solid argon have been obtained in the range 1/400-4000 cm. Bands attributed to HF and to HF-H2O oligomers were observed. HF stretching modes were assigned to dimer, chain trimer, cyclic tetramer, and cyclic hexamer of HF. Some of the FH...F angle deformation modes were observed for these molecules. The oligomers are formed during matrix deposition and the chain trimers appear to be matrix stabilized in a double substitution site in argon. Application of a nonideal gas model to the literature vapor phase data on HF suggests that the dimer and the hexamer are the dominant vapor phase oligomers, with the hexamer most important near saturation vapor pressures. The tetramer is the next most important vapor phase oligomer, but it contributes only weakly to the vapor phase properties. Minimal basis set STO-3G computations on chain and cyclic HF trimer and tetramer molecules suggest the marked increase in stability that arises on catenation or (unstrained) cyclization of HF systems. (Author)

AD-A074 182/7 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Dept of Chemistry
Photoactivation of Cobalt Carbonyl Catalysts: Generation of Reactive Mononuclear Fragments from Dinulcear, Metal-Metal Bonded Complexes.
Technical rept.,
Carol L. Reichel, and Mark S. Wrighton. 12 Sep 79, 16p Rept no. TR-18-ONR
Contract N00014-75-C-0880

The metal-metal bonded complexes (CO2(CO)6L2) (l = p(n-Bu)3, P(OPh)3) and Fe(n5-C5H5) (CO)2CO)(CO)3(P(OPh)3)) all undergo efficient (theta greater than 0.1 at 355 nm) photochemical metal-metal bond cleavage to produce reactive 17-valence electron (CO(CO)3L) fragments. In the presence of 1-pentene no alkene isomerization is found for L = P(n-Bu)3; low, but significant, photocatalytic activity is found for L = P(OPh)3 or when the P(n-Bu)3 complex is irradiated in the presence of P(OMe)3. The Co(CO)3L) precursors are strikingly more active when irradiation is carried out in the presence of HSiEt3, a hydride source. Both alkene isomerization and n-pentane formation are observed, along with small quantities of Si-containing products. The Fe(n to the fifth power-C5H5)(CO)2) radical photogenerated independently from (Fe2(n to the fifth power-C5H5)2(CO)4 is not active under any conditons used thus far. The activity of 17-valence electron radicals in this application is Co(CO)3(P(OPh)3)) > Co(CO)3(P(n-Bu)3)) > Fe(n to the fifth power-C5H5)(CO)2). These species are not themselves effective catalysts but do seem to react with HSiEt3 to form catalytically active, mononuclear Co-hydride complexes. (Author)

AD-A074 183/5 PC **A02**/MF **A01**
New York Univ NY Dept of Physics
Theoretical Studies Relating to the Interaction of Radiation with Matter: Atomic Collision Processes Occurring in the Presence of Radiation Fields.
Annual rept. no. 2, 1 Aug 78-31 Jul 79,
P. R. Berman. 15 Aug 79, 9p
Contract N00014-77-C-0553

Work is reported in the areas of: Collisional studies using laser spectroscopy; The nature and validity

of collision kernels; Strong field effects in laser spectroscopy; Collisionally-aided radiative excitation including a model potential calculation; Radiative collisions including model potential calculations; Collisional studies using photon echoes or Optical Ramsey Fringes; Photon echoes produced by standing-wave fields; and Photo-ionization by pulsed laser fields. (Author)

AD-A074 220/5 PC **A02**/MF **A01**
Georgia Inst of Tech Atlanta Engineering Experiment Station
The Kinetics and Spectroscopy of Aircraft and Rocket Plume Constituents.
Interim scientific rept. no. 2, 1 Jun 78-31 May 79,
F. P. Tully, and A. R. Ravishankara. 31 Jul 79, 23p AFOSR-TR-79-0969
Contract F49620-77-C-0111

Utilizing the technique of flash photolysis-resonance fluorescence the rate constants for the reactions of hydrozyl radicals (OH) with hydrogen, methane, carbon monoxide and ethane were measured at elevated temperatures as high as 1020K. Distinct curvature was observed in the Arrhenius plots for all four reactions. The measured rate constants were compared with previous measurements in the literature. Future measurement plans were outlined. (Author)

AD-A074 221/3 PC **A03**/MF **A01**
Hull Univ (England) Dept of Chemistry
Kinetics of Hydrogen-Oxygen and Hydrocarbon-Oxygen Reactions.
Interim rept. 1 Apr 77-30 Jun 79,
Robert R. Baldwin, and Raymond W. Walker. Jun 79, 35p AFOSR-TR-79-0970
Grant AFOSR-77-3215

(1) Refinement of the rate constants obtained from studies of the H2+O2 reaction at 500 degrees C has continued. (2) Rate constants for the reactions of H atoms and OH radicals with C2-C5 alkanes have been refined, and Arrhenius parameters obtained. New studies have been made of the addition of 2,2,3,3-tetrameth ylbutane and 2,2,3-trimethylbutane to slowly reacting mixtures of H2+O2 at 480 degrees C. (3) The mechanism of CO2 formation in propionaldehyde oxidation, and of acetone formation in isobutyraldehyde oxidation at 440 degrees C has been examined. Rate constants have been obtained for the initiation process and for attack of HO2 at the various C-H bonds. (4) The homogeneous decomposition of 2,2,3,3-tetramethylbutane in the presence of O2 has provided a source of HO2 radicals and preliminary rate constants for HO2+TMB, and for HO2+C2H6 have been obtained at 440 debrees C. The Thermochemistry of the t-butyl radical, and its reaction with H2 and O2 have been discussed. (5) Interpretation of the N2O+H2 reaction continues. (Author)

AD-A074 264/3 PC **A03**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Electron Spin Resonance Studies of Hydrogen and Deuterium Bombardment of Unsaturated Hydrocarbons At 77K.
Technical rept.,
Cornelius U. Morgan, and Kevin J. White. Jul 79, 30p ARBRL-TR-02178, AD-E430 296

The interaction of free atoms and radicals with unsaturated compounds has been a field of considerable interest. In this present work, the reactions of solid unsaturated hydrocarbons at 77K with gaseous hydrogen atoms are studied by electron spin resonance (esr). The hydrogen atom adds directly to the terminal position of the double bond of trans-2-butene, 2,3-dimethyl-1, 3-butadiene, 2-methyl-1-butene-3-yne, 3,3-dimethyl-1-butene, isobutylene, ethylene, and propylene to produce the sec-butyl, 2,3-dimethyl-2-butenyl, 1,1-dimethyl-2-propynyl, 1,2,2-trimethyl propyl, t-butyl, ethyl, and isopropyl radicals, respectively. The addition reaction of H atoms to trans-1,3-pentadiene occurs at the terminal carbon atom of the terminal double bond to produce the 1-methyl-2-butenyl radical. Confirmation of an addition reaction was made by bombarding the unsaturate first with hydrogen and then with deuterium. The two radicals can be distinguished by their esr spectra. On bombardment of allene with H atoms the allenyl radical was observed. This radical was produced by an abstraction of a hydrogen atom from allene.

AD-A074 278/3 Not available NTIS
Pennsylvania Univ Philadelphia Dept of Chemistry
Parity Forbidden Polariton Fusion in Molecular Crystals,
Robin M. Hochstrasser, and Gerald R. Meredith. 9 May 77, 3p ARO-13577.2-P
Grant DAAG29-76-G-0198
Availability: Pub. in the Jnl. of Chemical Physics, v67 n3 p1273-1274, 1 Aug 77. (No copies furnished by DDC).

No abstract available.

AD-A074 280/9 Not available NTIS
Rice Univ Houston TX Dept of Chemistry
Matrix-Isolation Infrared and Electron Paramagnetic Resonance Spectroscopic Studies of the Reaction of Lithium with Silicon Tetrafluoride,
Dale L. Perry, Paul F. Meier, Robert H. Hauge, and John L. Margrave. 13 Jul 77, 4p
Grant DAAG29-77-G-0169
Prepared in cooperation with California Univ., Berkeley. Dept. of Chemistry.
Availability: Pub. in Inorganic Chemistry, v17 n5 p1364-1367 1978 (No copies furnished by DDC).

No abstract available.

AD-A074 301/3 Not available NTIS
Kansas State Univ Manhattan Dept of Chemistry
The Reaction of 2-Trifluoromethyl-3,3-difluorooxaziridine with Some Fluorinated Nucleophiles,
Akira Sekiya, and Darryl D. DesMarteau. 11 Oct 78, 3p ARO-14339.1-C
Contract DAAG29-77-G-0071
Availability: Pub. in Jnl. of Organic Chemistry, v44 n7 p1131-1133 1979 (No copies furnished by DDC).

No abstract available.

AD-A074 307/0 Not available NTIS
University of Southern California Los Angeles Dept of Chemistry
Time-Cross-Link Density Reduction for Use in Long Time Behavior Prediction,
C. Ying-Cheung Lee, and J. J. Aklonis. 8 Dec 78, 14p ARO-13844.3-C
Grant DAAG29-76-G-0194
Availability: ACS Symposium Series on Durability of Macromolecular Materials, n95 p219-232 1979. (No copies furnished by DDC).

No abstract available.

AD-A074 308/8 Not available NTIS
Oregon Univ Eugene Dept of Physics
Atomic Electron Correlation in Nuclear Electron Capture,
Mau Hsiung Chen, and Bernd Crasemann. 21 Feb 78, 4p ARO-15208.2-P
Grants DAAG29-78-G-0010, NGR-38-003-036
Availability: Pub. in Physical Review Letters, v40 n22 p1423-1426, 29 May 78. (No copies furnished by DDC).

No abstract available.

AD-A074 327/8 Not available NTIS
Texas Univ at Austin Dept of Chemistry
Photothermal Spectroscopy,
George H. Brilmyer, Akira Fujishima, K. S. V. Santhanam, and Allen J. Bard. 15 Jul 77, 6p ARO-13172.4-C
Grant DAAG29-76-G-0015
Availability: Pub. in Analytical Chemistry, v49 n13 p2057-2062 Nov 77 (No copies furnished by DDC).

No abstract available.

AD-A074 329/4 Not available NTIS
Rockwell International Thousand Oaks CA Science Center
Electron Spin Resonance Spectra of the (14)NF3(+) and (15)NF3(+) Radical Cations,
I. B. Goldberg, H. R. Crowe, and K. O. Christe. 18 Apr 78, 6p ARO-14394.3-C
Contract DAAG29-77-C-0007
Availability: Pub. in Inorganic Chemistry, v17 n11 p3189-3194 1978. (No copies furnished by DDC).

No abstract available.

AD-A074 331/0 Not available NTIS
Utah Univ Salt Lake City Dept of Chemistry
Theoretical Studies of Negative Molecular Ions,
Jack Simons. 1977, 29p ARO-14343.1-C
Grants DAAG29-77-G-0193, NSF-CHE75-19376
Availability: Pub. in Annual Review of Physical Chemistry, v28 p15-45 1977.

No abstract available.

AD-A074 334/4 Not available NTIS
Martin Marietta Labs Baltimore MD
ESCA and SEM Studies on Early C3S Hydration,
D. Menetrier, I. Jawed, T. S. Sun, and J. Skalny. 26 Apr 79, 11p ARO-15771.1-MS
Contract DAAG29-78-C-0041
Availability: Pub. in Cement and Concrete Research, v9 n4 p473-482 1979. (No copies furnished by DDC).

No abstract available.

AD-A074 342/7 Not available NTIS
Lockheed Missiles and Space Co Inc Palo Alto CA Palo Alto Research Lab
Translational Spectroscopy of Metastable Fragments Produced by Dissociative Excitation of Chlorine,
W. C. Wells, and E. C. Zipf. 14 Oct 76, 3p ARO-11166.10-P
Grants DAAG29-76-G-0343, NGL-39-011-030
Availability: Pub. in The Jnl. of Chemical Physics, v66 n12 p5828-5829, 15 Jun 77 (No copies furnished by DDC).

No abstract available.

AD-A074 345/0 Not available NTIS
SRI International Menlo Park CA Molecular Physics Center
Generation of O2(C 1 Sigma (-) sub u, C 3 Delta sub u, A 3 Sigma (+) sub u) from Oxygen Atom Recombination,
T. G. Slanger. 3 Jul 78, 13p ARO-14708.2-C
Contracts DAAG29-77-C-0018, NASw-2849
Availability: Pub. in the Jnl. of Chemical Physics v69 n11 p4779-4791, 1 Dec 78 (No copies furnished by DDC).

No abstract available.

AD-A074 349/2 Not available NTIS
Colorado Univ Boulder Dept of Chemistry
Nucleation and Molecular Clustering about Ions,
A. W. Castleman, Jr. 1979, 57p ARO-14191.5-CX
Contract DAAG29-76-G-0276, Grant NSF-ATM76-14914
Availability: Pub. in Advances in Colloid and Interface Science, v10 p73-128 1979 (No copies furnished by DDC).

No abstract available.

CONF-790582-1 PC **A02**/MF **A01**
Argonne National Lab., IL.
Nuclear Magnetic Resonance Studies of Nucleoside Conformational Properties.
S. S. Danyluk. 1979, 23p
Contract W-31-109-ENG-38
NATO advanced study institute, Sogesta, Urbino, Italy, 7 May 1979.

This paper focuses on the applications of NMR spectroscopy in the conformational analysis of nucleosides and nucleotides. 64 references, 9 figures, 5 tables. (ERA citation 04:050420)

CONF-790658-2 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Analysis of U and Pu Resin Bead Samples with a Single Stage Mass Spectrometer.
D. H. Smith, R. L. Walker, L. K. Bertram, and J. A. Carter. 1979, 2p
Contract W-7405-ENG-26
27. annual conference on mass spectrometry and allied topics, Seattle, WA, USA, 3 Jun 1979.

Resin bead sampling enables the shipment of nanogram U and Pu quantities for analysis. Application of this sampling technique to safeguards was investigated with a single-stage mass spectrometer. Standards gave results in good agreement with NBS certified values. External precisions of +-0.5% were obtained on isotopic ratios of approx. 0.01; precisions on quantitative measurements are +-1.0%. (ERA citation 04:050408)

CONF-790663-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Multicomponent Methods for the Identification and Quantification of Polycyclic Aromatic Hydrocarbons in the Aqueous Environment.
W. H. Griest, M. P. Maskarinec, S. E. Herbes, and G. R. Southworth. 1979, 22p
Contract W-7405-ENG-26
Symposium on analysis of waters associated with alternate fuel production, Pittsburgh, PA, USA, 4 Jun 1979.

The development of sensitive and specific analytical methodology for the determination of the polycyclic aromatic hydrocarbon (PAH) content of aqueous samples is critical to studies defining the discharge, distribution, persistance, and fate of PAHs in the aqueous environment. Multicomponent PAH analytical methods developed in this laboratory for freshwater streams and rivers and their application to samples from the aqueous environment around a coal coking plant are discussed. (ERA citation 04:048956)

CONF-790702-1 PC **A02**/MF **A01**
Allied Chemical Corp., Idaho Falls, ID.
Laboratory Design for Modern Analytical Instruments.
G. V. Wheeler. 1979, 14p
Contract EY-76-C-07-1570
International conference on atomic spectroscopy, Cambridge, UK, 1 Jul 1979.

The Idaho National Engineering Laboratory is planning two new buildings which will include analytical chemistry laboratories housing spectroscopic instruments. The rationale used in designing these laboratories is discussed. (ERA citation 04:050398)

COO-1198-1246 PC **A10**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Physics.
Studies in the Electronic Structure of Matter.
D. L. Miller. 1979, 215p
Contract EY-76-C-02-1198
Thesis.

KLL Auger transition rates for helium are computed using simple atomic orbital wavefunctions which take into account the difference in average electron--electron repulsion of initial and final states. The results are consistent with transition rates computed by other authors using a variety of many-electron techniques. It is suggested that wavefunctions determined in the manner described provide a useful representation of the autoionizing state within the first Bohr radius. A method for extracting atomic pseudopotentials from photoelectron angular distributions is described and applied photoionization of the outermost p shells of Ar, Kr, and Xe and to the 4d shell of Xe. The pseudopotentials obtained reproduce the data, and also predict accurate cross sections and phase shifts for photoelectron energies up to 100 eV. It is suggested that the pseudopotentials aptly mimic the effects of intrashell electron--electron correlations in the photoionization process. The extended Hueckel theory is applied to the nitrogen trap in GaAs and GaP. Perfect crystal band structures are computed and are shown to be in reasonable agreement with those computed with empirical pseudopotentials. Nitrogen impurity levels in GaAs and GaP are computed using an extended Hueckel cluster model. In each case the model predicts two states within the band gap, in contrast to experiment which detects one impurity state in GaP and none in GaAs. It is suggested that the choice of cluster used unrealistically concentrates states near the conduction band edge on the central atom. (ERA citation 04:037645)

COO-4948-1 PC **A02**/MF **A01**
State Univ. of New York at Binghamton. Dept. of Chemistry.
Energies and Bonding in Manganese Phosphides. Annual Progress Report, July 1, 1978–June 30, 1979.
C. E. Myers, and E. D. Jung. Mar 79, 12p
Contract ER-78-S-02-4948

Manganese monophosphide and other first row transition metal phosphides have been studied by x-ray photoelectron spectroscopy. Electron bindng energies of both valence-conduction band and core level electrons show an evolution of metallic behavior in the series ScP, TiP, VP, MnP, FeP. Phosphorus dissociation pressure measurements on MnP lead to: 4MnP/sub (s)/ = 2Mn sub 2 P/sub (s)/ + P/sub 2(g)/ , delta H exp 0298 sub 15 = 69.8 kcal when the data are treated by the third law method using estimated entropies. Combination of this result with published data yields delta H exp 0 /sub f,298.15/(MnP) = -27.2 kcal/mole which is in satisfactory agreement with the published value of -23.0 kcal/mole. The apparently low value of the atomization enthalpy of MnP is confirmed and is attributed to a high valence state preparation energy. (ERA citation 04:050416)

DOE/W-7405-eng-26-T1 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Systematic Study of Metal Ion Sorption on Selected Geologic Media. Sesquiannual Report, April 1977–September 1978.
R. E. Meyer. May 79, 99p
Contract W-7405-ENG-26

This report summarizes results of the first year and a half of a research program on equilibria of inorganic ions between selected minerals and aqueous solutions covering a wide range of composition. The work is motivated by needs of information for enhanced oil recovery and isolation of nuclear waste, as well as by interest in the fundamental chemistry. Emphasis during the period has been on development of techniques; adsorption of alkali metal ions, alkaline earth ions, and rare earth ions on clays, particularly montmorillonite, and determination of the extent to which behavior can be correlated by ideal ion-exchange equations; canvass of effects of purification of minerals and of differences in properties between natural samples from different sources; evaluation of divalent transition element ions as tracers for underground water flow; and adsorption measurements of certain actinides of particular importance in nuclear wastes. 29 tables, 37 figures. (ERA citation 04:048963)

EMSL-LV-0539-17 PC **A06**/MF **A01**
Environmental Monitoring and Support Lab., Las Vegas, NV.
Radiochemical Analytical Procedures for Analysis of Environmental Samples.
F. B. Johns, P. B. Hahn, D. J. Thome, and E. W. Bretthauer. Mar 79, 115p
Contract EY-76-A-08-0539

This manual is a compilation of the chemical and physical procedures used at the Environmental Monitoring and Support Laboratory--Las Vegas for determining radionuclides in environmental surveillance samples. It supersedes the Handbook of Radiochemical Analytical methods published as EPA-680/4-75-001 in February 1975. It should be noted that the procedures in the current compilation are intended for use in processing relatively large numbers of samples in the shortest possible time for environmental radiological surveillance and, therefore, in some cases represent a compromise between precise analytical determination and adequate determination for surveillance purposes. (ERA citation 04:050405)

FE-2729-5 PC **A03**/MF **A01**
Brigham Young Univ., Provo, UT.
Alloy Catalysts with Monolith Supports for Methanation of Coal-Derived Gases. Quarterly Technical Progress Report, September 21, 1978--December 20, 1978.
C. H. Bartholomew. 5 Jan 79, 29p
Contract EF-77-S-01-2729

Results from previously reported support geometry studies supplemented with recent calculations were summarized in a paper submitted to the American Institute of Chemical Engineers. Calculations of Thiele moduli, effectiveness factors and mass transfer coefficients for pellets and monoliths reveal that under reactor conditions monoliths are more active than pellets because of lower pore diffusion resistance and higher rates of film mass transfer. Long-term thermal degradation tests of high loading (20% nickel on alumina) indicate that the catalyst deactivates slowly at 723 and 773 degrees K. Deactivation is mainly due to sintering and carbon fouling. A new electron microscopy technique for measuring nickel crystallite size was developed. The estimate of nickel crystallite size obtained using this technique compare favorably with those from chemisorption data. (ERA citation 04:048049)

JUEL-1559 PC **A06**/MF **A01**
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Grenzflaechenforschung und Vakuumphysik.
Adsorption and Reduction of Nitric Oxide on Platinum Surfaces.
G. Pirug. Dec 78, 103p
In German.
U.S. Sales Only.

As an introduction, the experimental measuring methods and equipment and the characterization of pure Pt(100) surfaces are described. After this, NO adsorption on Pt(100) surfaces is dealt with. For this the chemical bonding state, r.e. molecular adsorption of NO, dissociation of molecular adsorbed NO, dissociated adsorption, adsorption kinetics and structure, and binding configuration are discussed. The reduction of NO by H sub 2 in polycrystalline Pt surfaces is dealt with, and adsorption, desorption isothermal decomposition, and the NO + H sub 2 reaction are described in detail. (ERA citation 04:048964)

LBL-7701 PC **A05**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Symposium Commemorating the 25TH Anniversary of Elements 99 and 100.
G. T. Seaborg, and C. Webb. Apr 79, 89p CONF-780134-
Contract W-7405-ENG-48
Symposium commemorating the 25th anniversary of the discovery of elements 99 and 100, Berkeley, CA, USA, 23 Jan 1978.

Separate abstracts were prepared for five of the contributions to this symposium. The four remaining ones have already been cited in ERA and may be located by reference as the entry CONF-780134-- in the Report Number Index. (ERA citation 04:050657)

LBL-9086 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Thermal Conductivity of Aqueous NaCl Solutions from 20 exp 0 C to 330 exp 0 C.
H. Ozbek, and S. L. Phillips. May 79, 26p
Contract W-7405-ENG-48

An evaluation of published data on the thermal conductivity of aqueous NaCl solutions is presented. The literature was screened from 1929 through 1979, and the evaluated data were tabulated. The data were converted where necessary to a set of internally consistent units of exp 0 C, watts/m- exp 0 C and molal concentrations. An empirical correlation equation with an average deviation of +-2% is given for the thermal conductivity of aqueous NaCl solutions from 20 exp 0 C to 330 exp 0 C at saturation pressures. A table of smoothed values generated using this correlation equation is provided for NaCl concentrations between 0 and 5 molal over this temperature range. (ERA citation 04:049835)

LBL-9177 PC **A05**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Extraction of Phenols from Coal Conversion Process Condensate Waters.
D. C. Greminger, and C. J. King. Jun 79, 98p
Contract W-7405-ENG-48
Thesis.

Condensate water samples from two typical coal-conversion processes were analyzed for phenols by gas chromatography-mass spectrometry and high-performance liquid chromatography. Significant amounts of phenol, dihydroxybenzenes and the trihydroxybenzene phloroglucinol were found. The presence of a trihydroxybenzene is particular-

ly important as trihydroxybenzenes are extremely resistant to biological oxidation. The effects of water-phase pH on the extraction equilibria of the weakly acidic phenols were studied in a series of pH-controlled batch extractions of phenol, resorcinol, and hydroquinone into diisopropyl ether (DIPE) and hydroquinone into methyl isobutyl ketone (MIBK). The equilibrium distribution coefficient K/sub D/ decreased sharply in the pH range typical of condensate waters, 8.7-9.8, which is also the range of the pK/sub a/'s of the phenols. A simple model combining the acid ionization and the phase distribution equilibria fit the data well. Batch extractions of di- and trihydroxybenzenes into MIBK and DIPE showed MIBK to be clearly a better solvent than DIPE. The distribution coefficients in MIBK were an order of magnitude greater than those in DIPE, some of which were much less than unity. DIPE is currently used in the Phenosolvan process to extract phenol from coke-oven and coal-conversion effluent waters. With the K/sub D/'s measured in this work, calculations showed that the Phenosolvan process, as currently run, will not remove polyhydroxybenzenes from alkaline water solution to the levels required for further treatment, recycle or discharge of the condensate waters. (ERA citation 04:048050)

NYU/DAS-79-02 PC **A03**/MF **A01**
New York Univ., NY. Div. of Applied Science.
Bed Expansion and Heat Transfer Measurement in a Pressurized Fluidized Bed.
V. Zakkay, G. Miller, S. Rosen, S. Shah, and A. K. Kolar. Apr 79, 26p CONF-790423-14
Contract EX-76-S-01-2317
Multiphase flow and heat transfer symposium workshop, Miami Beach, FL, USA, 16 Apr 1979.

The feasibility of utilizing pressurized bed coal combustion for the generation of electricity is presently being considered by several industrial organizations. At present, only atmospheric units of large scale are available, and little is known with respect to the effect of pressure on the flow characteristics within the bed. It is for this reason that the research at NYU is directed to the basic understanding of the fluid mechanics within a pressurized bed specifically with regard to maximizing heat transfer. In the present paper, detailed in-bed pressure and heat transfer measurements within a one-foot diameter bed are presented in order to deduce the effects of superficial velocity, bed pressure, and bed depth on an important parameter affecting the entire flow field, the expanded height of the bed. (ERA citation 04:048096)

N79-31359/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Induced IR-Absorption Spectrum of Gaseous Nitrogen.
M. O. Bulanin, P. V. Granskiy, and M. V. Tonkov. Aug 79, 9p NASA-TM-75653
Contract NASW-3199
Tran-Transl. Into English of Indutsirovannyy Spektr Ik-Pogloshcheniya Gazoobraznogo Azota, Russian Report, 1979 p 1-6. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prepared by Academy of Sciences (Ussr), Moscow.

The induced infrared absorption spectrum of gaseous nitrogen was studied. The coefficient of absorption of highly pure nitrogen was utilized to ascertain spectral dependence.

N79-31361/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
The Chemistry of Sodium Chloride Involvement in Processes Related to Hot Corrosion.
C. A. Stearns, F. J. Kohl, and G. C. Fryburg. 1979, 32p NASA-TM-79251, E-161
Conf-Presented at the Conf. On Advanced Materials for Alternate Fuel Capable Directy Fired Heat Engines, Castine, Maine, 30 Jul. - 3 Aug. 1979.

Thermodynamic and mass transport calculations, and laboratory experiments elucidating the behavior of sodium chloride in combustion environments, in the deposition process, and in reactions with certain oxides on the surfaces of superalloys are summarized. It was found that some of the ingested salt is separated out of the air stream by the compressor. However, sodium chloride does pass from the compressor to the combustor where numerous chemical reactions take place. Here some of the salt is vaporized to yield gaseous sodium chloride molecules. Hydrogen and oxygen atoms present in the combustion products react with some sodium chloride to yield other gaseous species such as sodium, and a fraction of the salt remains as particulates. Both the gas phase and condensed sodium chloride can lead to sodium sulfate formtion by various routes, all of which involve reaction with sulfur oxides and oxygen. In addition to contributing to the formation of sodium sulfate, the sodium chloride can contribute to corrosion directly.

N79-31403/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Thermophysical Property Data: Who Needs Them.
R. C. Hendricks. 1979, 27p NASA-TM-79241, E-149
Conf-Proposed for Presentation at the Winter Ann. Meeting of the ASME, N. Y., 2-7 Dec. 1979.

Specific examples are cited to illustrate the universal needs and demands for thermophysical property data. Applications of the principle of similarity in fluid mechanics and heat transfer and extensions of the principle to fluid mixtures are discussed. It becomes quite clear that no matter how eloquent theories (or experiments) in fluid mechanics or heat transfer are, results of their application can be no more accurate than the thermophysical properties required to transform these theories into practice - or in the case of an experiment, to reduce the data. Present day projects take place on such a scale that the need for international standards groups and mutual cooperation is evident.

N79-31841/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Carbon Monoxide Measurement in the Global Atmospheric Sampling Program.
T. J. Dudzinski. Sep 79, 26p NASA-TP-1526, E-9972

The carbon monoxide measurement system used in the NASA Global Atmospheric Sampling Program (GASP) is described. The system used a modified version of a commercially available infrared absorption analyzer. The modifications increased the sensitivity of the analyzer to 1 ppmv full scale, with a limit of detectability of 0.02 ppmv. Packaging was modified for automatic, unattended operation in an aircraft environment. The GASP system is described along with analyzer operation, calibration procedures, and measurement errors. Uncertainty of the CO measurement over a 2-year period ranged from + or - 3 to + or - 13 percent of reading, plus an error due to random fluctuation of the output signal + or - 3 to + or - 15 ppbv.

ORO-6035-1 PC **A02**/MF **A01**
Rice Univ., Houston, TX.
Hypersonic Beam Laser Photolysis. Technical Progress Report, July 15, 1978 to April 15, 1979.
R. E. Smalley. 1979, 9p
Contract ER-78-S-05-6035

Substantial accomplishments have been achieved in three major areas: (1) the photolysis-probe laser system; (2) the pulsed beam apparatus; and (3) initial laser photolysis experiments on ketene to produce the methylene radical. (ERA citation 04:048976)

PATENT-4 140 771
Not available NTIS
Department of Energy, Washington, DC.
Process for Preparing Active Oxide Powders.
Patent,
M. F. Berard, O. Hunter, Jr., L. E. Shiers, S. L. Dole, and R. W. Scheidecker. Filed 24 Feb 78, patented 20 Feb 79, 8p PAT-APPL-880 921
Supersedes PAT-APPL-880 921-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An improved process is described for preparing active oxide powders in which cation hydroxide gels, prepared in the conventional manner are chemically dried by alternately washing the gels with a liquid organic compound having polar characteristics and a liquid organic compound having nonpolar characteristics until the mechanical water is removed from the gel. The water-free cation hydroxide is then contacted with a final liquid organic wash to remove the previous organic wash and speed drying. The dried hydroxide treated in the conventional manner will form a highly sinterable active oxide powder. The materials have high-temperature applications such as use in MHD generators and wall linings for fusion reactors. (ERA citation 04:050347)

PATENT-4 144 151
Not available NTIS
Department of the Army Washington DC
Production of B10H14 from B2H6 at Room Temperature by Laser Induced Chemistry Using DF Laser.
Patent,
James A. Merritt. Filed 12 Jun 78, patented 13 Mar 79, 5p AD-D006 343/8, PAT-APPL-914 698
Supersedes PAT-APPL-914 698-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method for the production of B10H14 by laser induced chemistry is disclosed. A DF laser is used to irradiate a laser reaction cell containing diborane (B2H6). The P12 (2611 cm to the -1) frequency of the 1-0 band of the DF laser is resonant with the v8 (2614 cm to the -1) vibrational fundamental of B2H6 and starts a chain reaction producing solid white crystals of B10H14 that condense on the walls of the laser reaction cell. The method is carried out at room temperature. Thus, the chemical engineering is very simple. The B10H14 produced is of high purity and high yield. The production of decaborane-14 from diborane by DF laser induced chemistry (LIC) represents an efficient synthesis of a large polyatomic molecule of high purity by LIC. (Author)

PATENT-4 153 761
Not available NTIS
Department of the Army Washington DC
Method of Removing Foulants from Ion Exchange Resins.
Patent,
Daniel G. Marsh. Filed 21 Apr 78, patented 8 May 79, 3p AD-D006 368/5, PAT-APPL-899 034
Supersedes PAT-APPL-899 034-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Foulants are removed from ion exchange resins by treating the foulant coated ion exchange resin with a weak aqueous solution of a compound that quickly decomposes the foulants. (Author)

PB80-101058 Not available NTIS
National Bureau of Standards, Washington, DC.
Fluorine Flame Calorimetry.
Final rept.,
G. T. Armstrong, and R. C. King. 1979, 27p
Sponsored in part by International Union of Pure and Applied Chemistry, Washington, DC.
Pub. in Combustion Calorimetry, n1, Chapter 15, p333-359 1979.

Procedures and instruments for fluorine flame calorimetry are reviewed in their application to thermochemical measurements. Gaseous fluorine and fluorinaceous oxidizers are made to react with a reducer (often hydrogen) in a constant pressure flame in a calorimetric reaction vessel and the products are effluent as gases in the one-phase procedure. In the two-phase procedure gaseous products are dissolved in water to form aqueous hydrofluoric acid or other hydrohalic acid solutions depending on the composition of the oxidizer. Inaccuracies in the method amount to about 0.1 per cent, with the largest contribution to the uncertainty being unidentified corrosion reactions involving the metals of the reaction vessels. The method has been applied successfully to establishing the enthalpy of formation of aqueous hydrofluoric and hydrochloric acids, three chlorine fluorides, trifluoramine oxide, oxygen difluoride and other fluorinaceous substances.

PB80-103518 PC **A19**/MF **A01**
Montana State Univ., Bozeman. Fisheries Bioassay Lab.
Aqueous Ammonia Equilibrium - Tabulation of Percent Un-Ionized Ammonia.
Extramural rept. 1 Jan 71-31 Dec 75,
Robert V. Thurston, Rosemarie C. Russo, and Kenneth Emerson. Aug 79, 437p EPA/600/3-79/091
Grant EPA-R-800861

The percent of un-ionized ammonia as a function of pH and temperature in aqueous ammonia solutions of zero salinity is presented in tabular form over the following ranges: temperature 0.0 to 40.0 C in increments of 0.2 degree, and pH 5.00 to 12.00 in increments of 0.01 pH unit.

PB80-105117 PC **A09**/MF **A01**
Illinois Univ. at Urbana-Champaign.
Adsorption of Energy-Related Organic Pollutants: A Literature Review.
Final rept. Jul 77-Apr 78,
K. A. Reinbold, J. J. Hassett, J. C. Means, and W. L. Banwart. Aug 79, 180p EPA/600/3-79/086
Contract EPA-68-03-2555

This report is a literature review on sorption properties of sediments and energy-related organic pollutants. Adsorption of organic compounds in general is discussed, and analytical methodology in soil thin-layer chromatography and chemical analysis as applicable to measurement of sorption properties is summarized. The literature on the adsorption of energy-related organic pollutants is reviewed. Reported constants for the adsorption of organic compounds on several adsorbents are tabulated, and factors that influence adsorption are discussed.

RFP-2793 PC **A02**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Evaluation of Methods for Cleaning Low Carbon Uranium Metal and Alloy Samples.
K. Kirchner, and M. Dixon. 5 Jul 79, 7p
Contract EY-76-C-04-3533

Several methods for cleaning uranium samples prior to carbon analysis, using a Leco Carbon Analyzer, were evaluated. Use of Oakite Aluminum NST Cleaner followed by water and acetone rinse was found to be the best overall technique. (ERA citation 04:048177)

RFP-2849 PC **A02**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Evaluation of Reaction Kinetics for Gas-Powder Systems.
J. L. Stakebake, and G. E. Bixby. 25 Jun 79, 25p
Contract EY-76-C-04-3533

Kinetic models for the reaction between a gas and powder are presented and discussed. Rates from the progressive conversion model are dependent on the amount of material present. This model is described by an equation that yields both the rate constant and the reaction order. The phase boundary model produces rates for topochemical reactions which are dependent on the powder surface area. Applications of these models to uranium powder hydriding are discussed. Computer programs for analyzing data also are included. 6 figures. (ERA citation 04:048967)

UCRL-52532(V.4)(Pt.3) PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Computer Automation of Continuous-Flow Analyzers for Trace Constituents in Water. Volume 4. Description of Program Segments. Part 3. TAASTART.
R. W. Crawford. 18 Jan 79, 20p
Contract W-7405-ENG-48

This report describes TAASTART, the third program in the series of programs necessary in automating the Technicon AutoAnalyzer. Included is a flow chart that illustrates the program logic and a description of each section and subroutine. In addition, all arrays, variables and strings are listed and defined, and a sample program listing with a complete list of symbols and references is provided. (ERA citation 04:050546)

UCRL-52815 PC **A09**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Studies in Molecular Dynamics of the Friction Coefficient and the Lorentz Gas.
W. E. Alley. 1 Jun 79, 185p
Contract W-7405-ENG-48
Thesis.

The thesis consists of three hard-sphere molecular dynamics studies. The first describes a modification of Fick's diffusion law, required whenever long-time correlations are present. The second study concerns the mass and size dependence of the friction coefficient as well as its dependence on boundary conditions. The study presents a molecular dynamics method which calculates the infinite-mass friction coefficient of finite size hard-sphere particles. The third study presents the applicability of hydrodynamics to describe fluctuations in fluids on the molecular level. This study shows that the fluctuations present in a system of hard spheres when placed between closely spaced parallel hard walls lead to an acoustical resonance for those wavelengths which correspond to the spacing, or integer fractions thereof. (ERA citation 04:050675)

UCRL-82596 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Determination of Absolute Quantum Efficiencies by Photoacoustic Spectroscopy.
A. Rosencwaig, M. J. Weber, and R. A. Saroyan. 13 Apr 79, 8p CONF-790819-5
Contract W-7405-ENG-48
Topical meeting on photoacoustic spectroscopy, Ames, IA, USA, 1 Aug 1979.

A method is described whereby the absolute radiative quantum efficiency of paramagnetic ions in liquids or solids can be determined from photoacoustic measurements. 1 figure. (ERA citation 04:050659)

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

PB80-100902 Not available NTIS
California Univ., San Diego, La Jolla. Inst. of Marine Resources.
Experimental Measurements of Nitrogen Remineralization in Coastal Waters.
William G. Harrison. c1978, 11p NSF/IDOE-79/79
Grant NSF-IDO74-04838
Pub. in Limnology and Oceanography, v23, n4, p684-694 1978.

Ammonium remineralization was measured in the euphotic zone of two coastal areas using a 15N isotope dilution technique. Remineralization fluxes were high in both areas and often exceeded assimilation fluxes. A strong positive correlation between ammonium remineralization and ammonium and carbon dioxide assimilation suggests a close coupling of photosynthesis and nitrogen recycling. Regenerative fluxes decreased with depth and with distance offshore, but to a relatively lesser extent than did assimilative fluxes. Turnover times for remineralization of utilizable organic nitrogen were estimated to be from 3 to 16 days. Size fractionation experiments and estimates from the literature suggest that microplankton (<183 micrometers) may have been the primary nitrogen remineralizers. (Copyright (c) 1978, by the American Society of Limnology and Oceanography, Inc.)

PB80-107071 PC **A04**/MF **A01**
National Marine Fisheries Service, Galveston, TX. Galveston Lab.
Environmental Studies of the South Texas Outer Continental Shelf, 1976-1977. Historical Zooplankton.
Final rept.,
E. Taisoo Park. Apr 79, 73p NOAA-79091404
Sponsored in part by Bureau of Land Management, Washington, DC. Prepared in cooperation with Moody Coll. of Marine Sciences, Galveston, TX. See also report dated Apr 79, PB-296 646.

Monthly samples taken at seven stations on two transects off the South Texas coast between 1963 and 1965 were used to examine temporal and spatial variability in zooplankton populations. These data were compared to data from four stations on a previously examined transect in the same area. Seasonal peaks of density in the zooplankton and copepods generally occurred in the spring and fall. Seasonal and year to year variability, however, was high. A trend of decreasing density with distance from shore was commonly exhibited in these major groups. The dominant groups of zooplanktonic organisms included Copepoda, Larvacea, Mollusca, Euconchoecia (Ostracoda), and Chaetognatha. Despite these difficulties, the general results on the abundances and distributions of major groups of zooplankton appeared similar in both studies.

PB80-107089 PC **A05**/MF **A01**
National Marine Fisheries Service, Galveston, TX. Galveston Lab.
Environmental Studies of the South Texas Outer Continental Shelf, 1977. Ichthyoplankton/Mackerel Eggs and Larvae.
Final rept.,
John H. Finucane, L. Alan Collins, Lyman E. Barger, and John D. McEachran. Apr 79, 78p NOAA-79091403
See also report dated 1976, PB-285 775. Sponsored in part by Bureau of Land Management, Washington, DC. Prepared in cooperation with Texas A and M Univ., College Station.

During each year of this baseline survey, king mackerel larvae were captured in increasing numbers from May through September with at least 50% of the larvae being captured in September. King mackerel larvae were more abundant over the outer continental shelf (32 to 183 m). Spanish mackerel larvae were captured from May through September during each year of this study and were less abundant than king mackerel. In comparing the Buccaneer Oil Field with BLM stations of comparable depth, no precise larval and egg abundance differences were noted between the areas. Direct comparisons of selected zooplankton taxa and ichthyoplankton indicated some linear correlations at the 95% and 99% confidence level which suggests that fish egg and larval abundance may be related to zooplankton abundance.

PB80-107113 PC **A04**/MF **A01**
National Marine Fisheries Service, Seattle, WA.
Morphological Comparisons of North American Sea Bass Larvae (Pisces: Serranidae).
Arthur W. Kendall, Jr. Aug 79, 59p NOAA-TR-NMFS-CIRC-428, NOAA-79092003

Larvae of 17 of the 23 nominal genera of American serranid fishes are described. Representatives of only two of these genera have been described previously from American waters. The genera fall into four groups which closely follow subfamilial groupings based on adult characters. Larvae of the Serranidae, representing seven genera, appear to be the most generalized and are most similar to Morone-like percichthyid larvae. They have some larval specializations but exhibit rather direct development of adult morphology. These larvae have variously developed strong spines on the head and in the opercular region, also the pelvic fin spine and some dorsal fin spines are strong and develop precociously.

8B. Cartography

N79-31748/3 PC **A05**/MF **A01**
Eurosat S.A., Geneva (Switzerland).
Study on the Identification of Services and Organizations Interested in the Use of the Spacelab Metric Camera.
Final Report.
C. L. P. Miller. 15 Dec 78, 89p CLP/PR/3278, ESA-CR(P)-1184
Contract ESA-3537/78-F-HC(SC)

Nine countries in Africa were visited and 40 organizations contacted. Results show that there is a great interest in the use of the Spacelab metric camera. The main cartographic interest involves the revision of existing maps, particularly on the 1:200,000 and 1:250,000 scale and the making of new topographic maps primarily scaled at 1:50,000 which presently exist for only about 18 percent of Africa. For thematic applications the camera tech-

nical characteristics are appreciated. Certain limitations in the performance of the camera, and the capability of various African organizations to use the product are discussed.

8C. Dynamic Oceanography

AD-A074 022/5 PC **A07**/MF **A01**
Coastal Engineering Research Center Fort Belvoir VA
Sediments, Shallow Subbottom Structure, and Sand Resources of the Inner Continental Shelf, Central Delmarva Peninsula.
Technical paper,
Michael E. Field. Jun 79, 126p Rept no. CERC-TP-79-2

A data base consisting of 880, 180, and 35 kilometers (475, 97, and 19 nautical miles) each of high resolution seismic reflection, bathymetric, and side-scan sonar profilings was obtained in 1970 and 1974, along with 71 vibratory cores and 3 onshore borings. These data were analyzed to assess the resource potential of sand suitable for use in beach restoration and to establish the Quaternary evolutionary framework of the northern Delmarva inner shelf. Shallow subsurface strata consist of gently dipping Neogene sedimentary beds that conform to the gradient and direction of the Atlantic Coastal Plain and display no evidence of tectonic deformation. Eleven major acoustic surfaces, including the presumed Tertiary-Quaternary nonconformity at about -30.5 to -61 meters (-100 to -200 feet), are present within the upper 122 meters (400 feet) of the shelf subbottom. Buried channels are common to the sea floor of the entire region; in the Delaware Bay entrance, most channels are cut to 46 meters (150 feet) below sea level and are filled laterally from both the New Jersey and Delaware shelves. Many small channels on the Maryland shelf are alined with existing onshore drainage or historical inlet sites.

AD-A074 273/4 PC **A07**/MF **A01**
Oregon State Univ Corvallis School of Oceanography
Towed Observations of Internal Waves in the Upper Ocean.
Master's thesis,
Thomas James Spoering. Jul 79, 129p Rept no. REF-79-10
Contracts N00014-76-C-0067, NOO014-79-C-0004

Observations between 20 and 40 m depth were made with a towed thermister chain in the North Pacific. Despite the rapid vertical variation of buoyancy frequency, spectra of isotherm displacements are in fair agreement with other observations and with the Garrett-Munk model. The spectra show evidence of a shoulder and break in slope at a wavelength of 1 km. There is no evidence of significant variation of spectral levels as a function of buoyancy frequency, tow direction or wind speed. A peak at a wavelength of 1 km in coherence spectra between pairs of isotherms separated in the vertical suggests that internal wave energy at this wavelength is dominated by the low modes. (Author)

AD-A074 369/0 PC **A04**/MF **A01**
Naval Research Lab Washington DC
Ocean Wave Spectrometer Measurements in the Gulf Stream Experiment.
Final rept.,
Davidson T. Chen, Donald L. Hammond, and Paul Bey. 20 Aug 79, 54p NRL-MR-4070, AD-E000 321

By assuming finite conducting, Gaussian-distributed, statistically stationary and homogeneous ocean surface, the ocean wave spectrometer measurements made in the Gulf Stream Experiment have demonstrated the capability of inferring the directional wave number slope spectra by using the specular point model for look-angles of less than 20 degrees. These measurements have also demonstrated the necessity of independent measurements of wind direction, mean square surface slope, and foam and spray. The results also indicate that at least four independent directional measurements with spatial resolution of 0.1 meters or smaller and spatial coverage of 750 to 1000 meters are necessary.

N79-31737/6 PC **A04**/MF **A01**
ECON, Inc., Princeton, NJ.
SEASAT-A ASVT: Commercial Demonstration Experiments. Results Analysis Methodology for the SEASAT-A Case Studies.
28 Aug 79, 62p NASA-CR-162162, DOC-79-292-2-REV-2
Contract NASW-3047
Misc-Revised.

The SEASAT-A commercial demonstration program ASVT is described. The program consists of a set of experiments involving the evaluation of a real time data distributions system, the SEASAT-A user data distribution system, that provides the capability for near real time dissemination of ocean conditions and weather data products from the U.S. Navy Fleet Numerical Weather Central to a selected set of commercial and industrial users and case studies, performed by commercial and industrial users, using the data gathered by SEASAT-A during its operational life. The impact of the SEASAT-A data on business operations is evaluated by the commercial and industrial users. The approach followed in the performance of the case studies, and the methodology used in the analysis and integration of the case study results to estimate the actual and potential economic benefits of improved ocean condition and weather forecast data are described.

PB80-106487 PC **A03**/MF **A01**
State Univ. of New York at Stony Brook. Marine Sciences Research Center.
An Assessment of the Effects of Bathymetric Changes Associated with Sand and Gravel Mining on Tidal Circulation in the Lower Bay of New York Harbor.
Special rept.,
Kuo-Chuin Wong, and R. E. Wilson. Jan 79, 31p SR-18, REF-79-1, NOAA-79091303

Present sand and gravel mining operations within the Lower Bay of New York Harbor are restricted to the east bank of Ambrose Channel and to the vicinity of Chapel Hill North Channel because of the concern that mining in other areas might adversely affect water quality and shore erosion. As part of an evaluation of environmental effects associated with expanded sand and gravel mining, the authors have simulated numerically tidal circulation patterns and tidal elevations in Lower Bay for a number of altered bathymetries corresponding to hypothetical mining operations. Results suggest that tidal currents will decelerate over the mined region and accelerate outside of them, and that the tidal stream will be deflected towards the region. It is also clear that the mining near the mouth of the Bay could increase tidal range along Staten Island substantially.

8E. Geodesy

ALO-3721-12 PC **A02**/MF **A01**
New Mexico Bureau of Mines and Mineral Resources, Socorro.
Terrestrial Heat Flow Studies in Arizona. Quarterly Technical Progress Report, 1 November 1978--31 January 1979.
C. R. Shearer, and M. Reiter. Feb 79, 5p
Contract EY-76-S-04-3721

Thermal conductivity measurements were made on lithologic samples from 12 temperature data sites. Two weeks were spent in Arizona in obtaining lithologic samples. Uranium analyses have been made for 12 locations in the Basin and Range and the Colorado Plateau. (ERA citation 04:048484)

N79-31738/4 PC **A03**/MF **A01**
EG and G Washington Analytical Services Center, Riverdale, MD.
Utilization of Satellite-Satellite Tracking Data for Determination of the Geocentric Gravitational Constant (Gm).
Final Report.
C. F. Martin, and I. H. Oh. Aug 79, 28p NASA-CR-156856
Contract NAS6-2495

Range rate tracking of GEOS 3 through the ATS 6 satellite was used, along with ground tracking of GEOS 3, to estimate the geocentric gravitational constant (GM). Using mulitple half day arcs, a GM of 398600.52 + or - 0.12 km3/sec2 was estimated using the GEM 10 gravity model, based on a speed of light of 299792.458 km/sec. Tracking station coordinates were simultaneously adjusted, leaving geopotential model error as the dominant error source. Baselines between the adjusted NASA laser sites show better than 15 cm agreement with multiple short arc GEOS 3 solutions.

8G. Geology and Mineralogy

AD-A073 873/2 PC **A03**/MF **A01**
Naval Ocean Research and Development Activity NSTL Station Ms
Henderson Seamount Geological Data.
Final rept. Feb 76-Oct 77,
Patrick T. Taylor. Feb 78, 30p Rept no. NORDA-TN-18

This report presents an analysis of geologic data (bottom photographs, sediment cores, seismic profiler records, and dredged samples) from the Henderson Seamount, Eastern Pacific Ocean. These data were gathered in support of the acoustic backscattering measurements made by the Naval Underwater Systems Center (NUSC). Discussion of these geologic measurements, therefore, will be made with respect to the acoustic results, i.e., an interpretation of microtopography, sediment distribution, and small-scale slopes will be emphasized. In order to compare Henderson Seamount with other Pacific Ocean Seamount, bottom photographs were obtained from Lamont-Doherty Geological Observatory. A discussion of the bathymetric slopes of the entire Henderson Seamount (i.e., from the abyssal plain to the peak) was given in the interim report. We will discuss in detail the results from the photographic coverage of the Henderson Seamount, and how our data compare with the photos obtained by ships of Lamont-Doherty Geological Observatory on various Pacific Ocean seamounts. (Author)

DOE/MC/05205-T2 PC **A03**/MF **A01**
Battelle Columbus Labs., OH.
Characterization and Analysis of Devonian Shales as Related to Release of Gaseous Hydrocarbons. Well 0-1 Christian County, Kentucky.
R. S. Kalyoncu, J. P. Boyer, and M. J. Snyder. 25 May 79, 39p
Contract DE-AC21-76MC05205

Partial data on the characterization of Well 0-1 (Christian County, Kentucky) shales were first reported in the Fifth Quarterly Technical Progress Report on January 1978. This report presents all the characterization data and its analysis on the 0-1 shales. Coring of Well 0-1 was accomplished in October 1976. A total of 17 samples were obtained, 13 for Battelle and 4 for other DOE Contractors. Methane is almost the sole hydrocarbon gas present in these shales, with higher chain hydrocarbon gases nearly nonexistent. An apparent increase in hydrocarbon gas contents with shale depth is observed. Other organic contents (in the form of carbon and hydrogen) also show an increase with increasing shale depth. An increase in hydrocarbon gas contents with carbon and hydrogen contents is also noticeable. Natural gas, carbon and hydrogen contents all vary inversely with bulk densities. 0-1 shales show low mercury intrusion porosities and very low to negligible gas permeabilities. Lithology of these shales is very similar to those previously reported, quartz being the most abundant single mineral. Illite and kaolin are the major clay minerals with a number of carbonates (nahcolite, sortite, siderite) present in moderate quantities. Pyrite is also observed in significant quantities. (ERA citation 04:049500)

DOE/MC/05205-T3 PC **A04**/MF **A01**
Battelle Columbus Labs., OH.
Characterization and Analysis of Devonian Shales as Related to Release of Gaseous Hydrocarbons. Well C-336 Martin County, Kentucky.
R. S. Kalyoncu, J. P. Boyer, and M. J. Snyder. 16 May 79, 61p
Contract DE-AC21-76MC05205

Partial data on the characterization of C-336 (Martin County, Kentucky) shales were reported in

the Sixth Quarterly Technical Progress Report, January through March 1978. Total characterization data and interpretation are presented in this individual Well Report on shales from Well C-336 (Ky No. 3). Coring of C-336 well was accomplished in November 1976. Samples were obtained at depths from 2479 to 3371 feet. 119 samples were collected for Battelle and 90 for other DOE contractors. Shales from Well C-336 exhibit relatively high hydrocarbon gas contents. Oxygen to nitrogen ratios in the gas analysis continue to be very low, leading to various possibilities mentioned in previous reports. Wide range in carbon contents characterizes the chemical composition of the organics in these shales. Positive relationships exist between the hydrocarbon gas contents and chemical data (carbon and hydrogen). Relationships between the physical data and gas contents are not as distinct, though, an inverse relationship does exist between the bulk density and hydrocarbon gas contents. (ERA citation 04:049501)

FE-8028-1 PC **A04**/MF **A01**
West Virginia Univ., Morgantown. Coll. of Mineral and Energy Resources.
Prediction of in-Situ Stresses from Directional Properties of Rock Cores for Field Development of Devonian Shale.
S. S. Peng, and S. Okubo. Aug 77, 65p
Contract EY-76-S-21-8028

The directional properties of Devonian shale were determined through four physical property measurements: Ultrasonic Velocity Measurement, Point Load Test, Brazilian Test and Measurement of Directional Elastic Constants. The core was taken from Well No. 20403 in Lincoln County, WV. The core with a total of 500 ft. consists of the following three sections: 2720 to 2836 ft., 3402 to 3473, and 3710 to 4026 ft. depth. The results of laboratory core analyses are as follows: (1) bedding planes are quite distinct; (2) the most preferred direction of fractures in the bedding plane is the 60 exp 0 direction (N 60 exp 0 E). (ERA citation 04:048152)

N79-32117/0 PC **A03**/MF **A01**
California Inst. of Tech., Pasadena. Seismological Lab.
Anorthite: Thermal Equation of State to High Pressures.
R. Jeanloz, and T. J. Ahrens. 1979, 47p NASA-CR-162180, CONTRIB-3275
Grant NSG-9019

The shock wave (Hugoniot) data on single crystal and porous anorthite ($CaAl_2Si_2O_8$) to pressures of 120 GPa are presented. These data are inverted to yield high pressure values of the Grueneisen parameter, adiabatic bulk modulus, and coefficient of thermal expansion over a broad range of pressures and temperatures which in turn are used to reduce the raw Hugoniot data and construct an experimentally based, high pressure thermal equation of state for anorthite. The hypothesis that higher order anharmonic contributions to the thermal properties decrease more rapidly upon compression than the lowest order anharmonicities is supported. The properties of anorthite corrected to lower mantle conditions show that although the density of anorthite is comparable to that of the lower most mantle, its bulk modulus is considerably less, hence making enrichment in the mantle implausible except perhaps near its base.

ORNL/EIS-121/V2/R1 PC **A12**/MF **A01**
Oak Ridge National Lab., TN.
Geological and Geochemical Aspects of Uranium Deposits: A Selected, Annotated Bibliography. Vol. 2, Rev. 1.
J. M. Thomas, M. L. Brock, P. A. Garland, M. B. White, and E. W. Daniel. Jul 79, 272p
Contract W-7405-ENG-26

This bibliography, a compilation of 490 references, is the second in a series compiled from the National Uranium Resource Evaluation (NURE) Bibliographic Data Base. This data base is one of six data bases created by the Ecological Sciences Information Center, Oak Ridge National Laboratory, for the Grand Junction Office of the Department of Energy. Major emphasis for this volume has been placed on uranium geology, encompassing deposition, genesis of ore deposits, and ore controls; and prospecting techniques, including geochemistry and aerial reconnaissance. The following indexes are provided to aid the user in locating references of interest: author, geographic location, quadrangle name, geoformational feature, taxonomic name, and keyword. (ERA citation 04:049507)

PB80-100670 PC **A03**/MF **A01**
Northwestern Univ., Evanston, IL. Technological Inst.
Growth and Stability of Thermally Induced Cracks in Brittle Solids.
L. M. Keer, S. Nemat-Nasser, and K. S. Parihar.
Sep 76, 37p NSF/RA-761789
Grant NSF-AER75-00187

The growth and stability of thermally induced equally spaced parallel cracks in a half-plane consisting of a homogeneous isotropic linearly elastic brittle material, are studied. At the initial time, the uniform temperature of the half-plane is reduced at its surface by a large increment (T sub 0), and then kept constant (at the surface). Because of heat conduction, a temperature gradient forms close to the surface and penetrates into the half-plane. Thermal contraction results in the formation of cracks perpendicular to the free surface. It is shown that if the cracks are initially parallel and equally spaced, and if the possibiliyt of branching is excluded, then they grow in time until a critical state is reached. At this state, alternate cracks stop growing, while the others begin to grow at a much faster rate. This process continues until another critical state is attained, where the cracks which had stopped growing, suddenly close, while the cracks which have continued growing, suddenly 'snap' into a finitely longer length. At this state the crack spacing is doubled. The whole process then repeats itself. Application to geothermal energy extraction from hot dry rock masses is mentioned.

SAND-77-1192 PC **A04**/MF **A01**
Sandia Labs., Albuquerque, NM.
Mechanical Behavior of New Mexico Rock Salt in Triaxial Compression Up to 200 exp 0 C.
W. R. Wawersik, and D. W. Hannum. Jul 79, 55p
Contract EY-76-C-04-0789

Three groups of tests are discussed to identify the relative and site-specific importance of deviator stress, confining pressure (mean stress), temperature, time (loading rate), and stress path. The three groups of experiments consist of (1) hydrostatic loading, (2) conventional triaxial compression tests (sigma sub 1 > sigma sub 2 = sigma sub 3 = const.), and (3) variable stress path tests including experiments at approximately constant sigma sub 1 and at constant mean stress. All data were generated on 100 mm-diameter specimens. The rock salt exhibited nonlinear response under all loading conditions, practically zero initial elastic limit and an apparent inseparability of permanent deformations into time-independent and time-dependent components. Pressure and temperature did not alter the elastic constants but affected the principal strain ratio, the ratio of volumetric to shear strain, rock salt ductility, and the ultimate stress. In particular, low pressure and temperature permitted pronounced dilatancy and loss in load bearing ability. Under such conditions the volumetric strains reached sizable fractions of the shear strains. Pressure remained important even at high temperature because it influenced the rate of shearing. Load path and stress history may be significant under deviatoric loading conditions and for large variations in pressure. 17 figures. (ERA citation 04:050638)

8H. Hydrology and Limnology

PB80-101850 PC **A05**/MF **A01**
Texas Water Development Board, Austin.
Suspended-Sediment Load of Texas Streams.
Compilation rept. Oct 71-Sep 75,
John P. Dougherty. May 79, 92p TDWR/R-233
See also report dated May 74, PB-296 449.Color illustrations reproduced in black and white.

The report covers the 1972 through 1975 water years, and is a supplement to Texas Water Development Board Reports 184, 106, and 45, Texas Water Commission Bulletin 6410, and Texas Board of Water Engineers Bulletin 6108. During the period covered by this report, 39 suspended-sediment sampling stations were operated. Suspended-sediment sampling stations operated by the Texas Department of Water Resources at or near streamflow-measuring stations use streamflow records collected by the U.S. Geological Survey in the determination of estimated suspended-sediment loads. Samples are collected in 8-ounce (236.6 ml) narrow-neck bottles at a position approximately 1 foot (0.3m) below the water surface near midstream. Presented with the sediment data obtained for the 1972 through 1975 water years is a summary table showing maximum, minimum, and average annual suspended-sediment transport passing each gaging point for a total period in full water years. Sediment outflow for four reservoirs in Texas were obtained during this report period.

PB80-103153 PC **A07**/MF **A01**
Oregon State Univ., Corvallis. Dept. of Fisheries and Wildlife.
Toward Classification and Rationale for Watershed Management and Stream Protection.
Final rept.,
Charles E. Warren. Jun 79, 149p EPA/600/3-79/059
Grant EPA-R-805423

Classification can be used for increased understanding of systems and for improved relations of people with their environments. This report offers a rationale for developing such a classification system for watershed management. A hierarchical classification is developed that is based on the potentials and environments of systems, especially on the capacities of watersheds and streams to remain in desirable states over relatively long times and to return to desirable states over relatively short times. The suggested approach is to classify headwater streams by using extant knowledge of biogeoclimatic regions, watershed environments, stream order, and the morphological capacities of stream beds.

RHO-LD-47 PC **A07**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Preliminary Investigation into the Theory and Techniques of Modeling the Natural Moisture Movement in Unsaturated Sediments.
B. A. Finlayson, R. W. Nelson, and R. G. Baca.
Feb 78, 148p
Contract EY-77-C-06-1030

A study was performed on the problem of developing a general computer model of fluid flow processes in arid site soil systems. Major focus of the study was the investigation of traditional numerical techniques for solving the strongly nonlinear equations of unsaturated flow theory. A generalized mathematical model is formulated which considers the fluid flow processes of capillarity, gravity, thermally induced liquid and vapor transport, and heat conduction. The concepts advanced by Phillips and de Vries are used in describing the temperature effects of fluid transport. Three fluid phases are considered in the unsaturated flow model, namely: liquid, vapor, and air. The generalized model is expressed as five nonlinear partial differential equations. Numerical methods such as finite difference, collocation, and finite element techniques are reviewed and evaluated. Based on the numerical experiments of this study, a finite difference method with upstream weighing is found to be a recommended approach. This approach, however, possesses limitations related to the degree of nonlinearity. The degree of difficulty associated with solving the nonlinear partial differential equations is related to the properties of matrix stiffness. A preliminary computer model based on a simplified model formulation is applied using data for a field lysimeter. Comparisons between measured and computed moisture profiles are made for the lysimeter. Only qualitative agreement was obtained in these tests. In addition, the numerical solution technique was found to be stable for only certain cases. Further testing would be needed to fully check out this preliminary model. (ERA citation 04:050635)

8I. Mining Engineering

BNL-51024 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.

Development of Cement for Geothermal Wells. Final Report.
G. L. Kalousek. 1 Mar 79, 25p
Contract EY-76-C-02-0016

Modifications of portland cement--silica and beta C sub 2 S--silica cements were studied at 150 to 350 exp 0 C (302 to 662 exp 0 F) and saturated steam pressure. Emphasis was on relating the chemistry of the cements to their properties. Particular attention was given to long-term strength, bond strength, and effects of weight-reducing agents. The effects of Al sub 2 O sub 3 , Fe sub 2 O sub 3 , SO sub 3 , Na sub 2 CO sub 3 , and Na sub 2 SO sub 4 on different binders were studied and were found to range from deleterious to beneficial. Aluminous tobermorite (A-Tobermorite), xonotlite, and truscottite were dominant ultimate binders. The present results and others indicate that truscottite may undergo serious strength retrogression upon long-term exposure. A-Tobermorite was stable to 250 exp 0 C (472 exp 0 F) or higher. Xonotlite exhibited a wide range in strength, and some limited evidence suggests that it too may undergo strength retrogression. No insurmountable difficulties were encountered with normal-weight cements, but light-weight cements posed some questions. With the problems at their current stage of definition, further research should be rewarding. (ERA citation 04:049829)

CONF-780886- PC **A22**/MF **A01**
West Virginia Univ., Morgantown. Dept. of Electrical Engineering.
Proceedings of the Fourth WVU Conference on Coal Mine Electrotechnology.
M. D. Aldridge. 1 Oct 78, 521p
WVU conference on coal mine electrotechnology, Morgantown, WV, USA, 2 Aug 1978.

Thirty-nine papers from the Proceedings have been entered individually into EDB and ERA. Topics covered included mine power systems, mine instrumentation, mine illumination, mine communications, automatic control and monitoring, regulations, power distribution instrumentation, power distribution equipment, electrical systems for mine trolleys, on-line computer control of mines and monitoring using microprocessors. (ERA citation 04:049462)

CONF-790580-1 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Chemistry and Materials in Geothermal Systems.
R. L. Miller. 1979, 11p
Contract EY-76-C-07-1570
ACS/CSJ chemical congress, Honolulu, HI, USA, 4 May 1979.

The development of a geothermal fluid, from its origin as meteoric water precipitating on the earth's surface, as it flows through the soils and rocks of geological formations, to the point where it returns to the surface as a hot spring, geyser, well, etc. is traced. Water of magmatic origin is also included. The tendency of these hydrothermal fluids to form scales by precipitation of a portion of their dissolved solids is noted. A discussion is presented of types of information required for materials selection for energy systems utilizing geothermal fluids, including pH, temperature, the speciation of the particular geothermal fluid (particularly chloride, sulfide and carbon dioxide content) and various types of corrosive attack on common materials. Specific examplers of materials response to geothermal fluid are given. (ERA citation 04:048482)

CONF-790805-1 PC **A02**/MF **A01**
Mobil Research and Development Corp., Dallas, TX.
Demonstration of Massive Hydraulic Fracturing: Piceance Basin, Rio Blanco County, Colorado.
J. L. Fitch, W. L. Medlin, and M. K. Strubhar. 1979, 25p
Contract EY-76-C-08-0678
DOE symposium on enhanced oil and gas recovery and improved drillings technology, Tulsa, OK, USA, 22 Aug 1979.

A massive hydraulic fracturing demonstration has been conducted by Mobil and DOE in Mesaverde and overlying sands below the productive Wasatch Formation in Mobil's Piceance Creek Field. The experimental well was drilled in 1977. During that year intervals between 9500 and 10,800 ft. were tested and massive fracturing treatments were carried out in two of them, zones 1 and 3. These zones were put on production during early 1978 with gas rate declining from about 4.0 to 1.1 MMCFD during an 86-day test period. Since May, 1978, four additional massive fracturing treatments have been conducted in zones 5 and 9. Treatment size was less than planned in three of these treatments because of severe treating pressure increases during fracturing, terminated by sand-outs. This problem had occurred to a lesser degree in zones 1 and 3. However, it did not occur in the topmost interval, zone 9, where a planned treatment with 700,000 lb. of sand was put away without difficulty. This interval, identified with the Ohio Creek formation, consists of about 150 ft. of almost continuous sand and appears to be less lenticular than the Mesaverde. The zone 9 treatment was the most successful of the entire sequence. Following cleanup it was produced at an initial rate of 4.0 MMCFD and declined to 2.0 MMCFD after 50 days of production. Following this test the well was shut in to remove two isolation plugs remainingin the well between zones 8 and 9 and between zones 3 and 4. Upon completion of this work the well will be produced into a sales line with flow from all zones to obtain flow behavior data for the entire well. This paper covers details of completion and testing work done on the well since mid-1978. Details of work done prior to that time are given in previous publications. (ERA citation 04:049492)

COO-4051-43 PC **A02**/MF **A01**
Southeastern Massachusetts Univ., North Dartmouth.
Economics of Geothermal Power.
R. DiPippo. Feb 79, 13p
Contract EY-76-S-02-4051

Geothermal, steam, nuclear, and hydraulic construction costs, power generating costs, and utilization rate are compared. The risk factor in exploratory geothermal wells is discussed. (ERA citation 04:048493)

COO-4227-7 PC **A02**/MF **A01**
Chicago Univ., IL.
Coal Anion Structure and Chemistry of Coal Alkylation. Seventh Quarterly Progress Report, September 1, 1978--November 30, 1979.
L. M. Stock. 1978, 22p
Contract EF-77-S-02-4227

Two areas of research are discussed. One concerns progress on the alkylation of the coal polyanion obtained from Illinois No. 6 coal using methyl iodide-C exp 13 and butyl iodide-1-C exp 13 . The other concerns progress on the comparison study of the reactions of tetralin-d sub 12 with Illinois No. 6 coal. (ERA citation 04:049455)

DOE/ET/28451-4 PC **A02**/MF **A01**
Oregon Inst. of Tech., Klamath Falls.
Testing and Modeling of Downhole Heat Exchangers in Shallow Geothermal Systems.
G. G. Culver, and G. M. Reistad. 1978, 4p RLO-2429-4, CONF-780708-27
Contract EY-76-S-06-2429
Geothermal Resources Council meeting, Hilo, HI, USA, 25 Jul 1978.

Results are reported of work on: characterizing flow in wells with perforated casings with and without downhole heat exchangers (DHE) installed, determining energy extraction rates for conventional DHES in both cased and uncased wells, and modeling of DHE systems to predict effects of heat exchangers and well variable changes. (ERA citation 04:048504)

DOE/IA-0007 PC **A06**/MF **A01**
Department of Energy, Washington, DC.
1985 Oil Production of 21 Oil Producing Non-OPEC Countries.
A. J. Warner. Mar 79, 105p

This report assesses the possibility of increased oil production from 21 less developed non-OPEC countries (excluding the Middle East and Mexico) by 1985. The forecast is compared with those prepared by the World Bank, the International Energy Agency, and others. The 21 Latin American, African, and Far East (including Asia) countries produce 2.5 million barrels of oil per day (BD) or 4.2% of world production, and they have 21 billion barrels of proved reserves, or 3.2% of the world total. In recent years these countries have consumed 3.1 million BD, some 0.9 million barrels in excess of their production. By 1985, the 21 countries may produce 3.9 million BD, an average annual increase of 5.0%; however, demand is expected to increase at an annual rate of 3.5% to 4.4 million BD. The net effect is that the 1985 aggregated supply-demand balance will be in deficit, by nearly 560 thousand BD, compared to slightly more than 930 thousand BD in 1976. (ERA citation 04:048102)

DOE/MC/05205-T1 PC **A04**/MF **A01**
Battelle Columbus Labs., OH.
Characterization and Analysis of Devonian Shales as Related to Release of Gaseous Hydrocarbons. Well P-1 Sullivan County, Indiana.
R. S. Kalyoncu, J. P. Boyer, and M. J. Snyder. 18 May 79, 74p
Contract DE-AC21-76MC05205

Partial data on the characterization of shales from Well P-1 (Sullivan County, Indiana) were presented in the Fifth Quarterly Technical Progress Report on The Characterization of Devonian Shale to DOE/METC (ORO-5205). This individual well report presents and discusses the total characterization data available on P-1 shales. Coring of the shale samples were accomplished in September, 1976. A total of 17 samples were obtained: 11 for Battelle and six for other DOE contractors. P-1 well exhibited relatively high hydrocarbon gas contents compared to other wells. Average hydrocarbon gas contents surrounding the free space in the canasters is about 61 percent of the total gases (including air). Methane and ethane make up the bulk of total hydrocarbons. Chemical characterization data (carbon and hydrogen contents) relate well with the hydrocarbon gas content, as do the bulk densities among the physical characterization data. (ERA citation 04:049488)

DOE/MC/05205-T4 PC **A03**/MF **A01**
Battelle Columbus Labs., OH.
Characterization and Analysis of Devonian Shales as Related to Release of Gaseous Hydrocarbons. Well C-338 Wise County, Virginia.
R. S. Kalyoncu, J. P. Boyer, and M. J. Snyder. 15 May 79, 45p
Contract DE-AC21-76MC05205

Battelle-Columbus Laboratories continues to submit Individual Well Reports on the Eastern Gas Shales Project. Results and their analyses on all six tasks are reported on the C-338 Well (Wise County, Virginia). Samples from the C-338 well were cored between depths of 4870 and 5475 feet. A total of 81 samples were obtained. Considerably high hydrocarbon gas contents are observed (average hydrocarbon gas content in the canisters was 63.1%). Higher chain hydrocarbon gases are also present in significant quantities. Average hydrocarbon gas volume per unit volume of shale is 1.2. Gas release kinetics studies on C-338 shales reveal diffusion coefficients in the order of 10 exp -7 cm exp 2 /s, which agree well with values of other shales. Excellent one-to-one correlations exist between the chemical characteristics (carbon, hydrogen contents) and hydrocarbon gas contents. Increasing carbon and hydrogen values are associated with higher hydrocarbon gas contents. Among the physical characterization data, densities are inversely related to organics contents, increasing the hydrocarbon gas contents. (ERA citation 04:049489)

DOE/RA-0037 PC **A19**/MF **A01**
Department of Energy, Washington, DC. Office of Leasing Policy Development.
Federal Leasing and Outer Continental Shelf Energy Production Goals.
Jun 79, 427p

The goals are determined by adding the production from existing OCS leases, estimated production from lease sales appearing on DOI's draft proposed lease schedule for 1979--81 and on DOE's schedule for the 1982--February 1985 period. DOE's average production goals can be stated in terms of current total OCS production and current

total domestic production of oil and natural gas. As a percent of estimated 1978 OCS production, the average goals are 97% for oil and 86% for gas in 1985, 204% for oil and 76% for gas in 1990, and 199% for oil and 45% for gas in 1995. Expressed as a percent of 1978 domestic production, the average goals amount to 9% for oil and 19% for gas in 1985, 20% for oil and 17% for gas in 1990 and 19% for oil and 10% for gas in 1995. The average oil production goals increase while the average gas production goals decrease from 1985 to 1990. From 1990 to 1995, there is a slight decrease in the average oil goal and a substantial decrease in the average gas goal. Reducing the maximum number of sales per year from seven to six results in 4% less total oil production and 15% less total gas production. This compares to 3% more total oil production and 2% more total gas production with eight sales per year. Compared to DOE's seven sales per year schedule for 1982--February 1985, DOI's draft proposed lease schedule for this same period provides 58% of the total oil production and 72% of the total gas production. This is a difference of 904 mmbbl of oil and 1459 bcf of gas production over the production life of the leases. (ERA citation 04:048103)

FE/EES-79/6 PC **A03**/MF **A01**
Department of Energy, Morgantown, WV. Process Evaluation Office.
Basic Estimated Capital Investment and Operating Costs for Subbituminous and Lignite Coal Strip Mines. Mines with Annual Production of 3, 4, and 5 MMtpy ROM Coal.
L. H. Berkshire. Apr 79, 37p

This study, prepared by the Process Evaluation Office, Division of Systems Engineering, Fossil Energy, estimates typical capital investments, operating costs, and the required selling prices for coal produced from hypothetical subbituminous and lignite strip mines in the Northern Great Plains province. Annual production for the subbituminous mine is 4 million tons; for the lignite mines, it is 3 and 5 million tons. Wage and union welfare rates are those that went into effect under the Western Coal Wage Agreement of 1977. Costs of materials and equipment are based on first-quarter 1979 indexes. It is assumed that the mines have a 20-year life. Two selling prices for coal were determined for each mine - one based on 12-, 15-, and 20-percent returns on equity, and the other based on the same returns with a debt-equity split of 1:2 with 9 percent interest paid on debt dollars. Investments for the mines are summarized in a table. (ERA citation 04:049464)

FE-1747-7 PC **A04**/MF **A01**
Equity Oil Co., Salt Lake City, UT.
BX In Situ Oil Shale Project. Quarterly Technical Progress Report, September 1--November 31, 1978.
P. M. Dougan. 15 Dec 78, 66p
Contract ET-78-F-03-1747

The construction of surface facilities at the BX In Situ Oil Shale Project continued during the quarter. All Project wells were completed, and the first tests using the flow retorting system of the Laboratory Research Program were conducted. Pre-startup environmental monitoring continued and the first quarterly report on air resources was prepared. (ERA citation 04:048149)

FE-2025-38 PC **A07**/MF **A01**
Gulf Universities Research Consortium, Bellaire, TX.
Naturally Occurring Carbon Dioxide Sources in the United States. A Geologic Appraisal and Economic Sensitivity Study of Drilling and Producing Carbon Dioxide for Use in Enhanced Oil Recovery.
F. W. Zimmerman, and C. W. Perry. Jan 79, 137p
Contract EX-76-C-01-2025

Large accumulations of gas containing high percentages of naturally occurring subsurface carbon dioxide are located in several geographic provinces of the United States. Central Mississippi, West Virginia, the Delaware--Val Verde Basins of West Texas and several locations in the Rocky Mountains contain gas deposits with high percentages of carbon dioxide. Preliminary characterizations of reservoir rock quality and gas composition were performed for these areas. Four significant accumulations of carbon dioxide were chosen for in-depth geologic, reservoir, and economic analyses. Anticipated flowing pressure, sustained flow rates, recovery efficiencies, original gas in place, and reserves were determined. Sensitivity studies designed to bracket a possible range of prices were generated, utilizing estimated development and production costs, for each of the four areas. Projections of the potential supply, profitability of drilling and producing, and preliminary analysis of potential demand for naturally occurring carbon dioxide are presented. (ERA citation 04:049477)

FE-8214-5-T1 PC **A02**/MF **A01**
Illinois State Geological Survey, Urbana.
Coordination of Study of the Devonian Black Shale in the Illinois Basin (Illinois, Indiana, and Western Kentucky). Annual Progress Report, February 1, 1978--January 31, 1979.
J. A. Lineback. 1 Feb 79, 22p
Contract EW-78-S-21-8214

This report presents some of the highlights of the New Albany Shale study in the Illinois Basin. A large data base is being generated for future workers to use. Evaluation of much of the data collected has yet to be attempted. Many more data and interpretations of those data will become available before the end of the project. With the exception of the aforementioned problems in the distribution and availability of core, no significant voids in the data being developed are seen. The data being collected will be more than adequate to evalute the potential of the New Albany as a conventional source of natural gas in the Illinois Basin. (ERA citation 04:049484)

LA-7889-MS PC **A09**/MF **A01**
Los Alamos Scientific Lab., NM.
Case History Report on East Mesa and Cerro Prieto Geothermal Fields.
DG. Davis, and S. K. Sanyal. Jun 79, 183p
Contract W-7405-ENG-36

Well log analysis as applied to the geothermal industry is one of the areas of technology in great need of further development. One means of improving log analysis technology is to study case histories of the past uses of log analysis as applied to specific fields. The project described in this report involved case history studies on two well-known geothermal areas in North America: the East Mesa field in California and the Cerro Prieto field in Mexico. Since there was considerably more pertinent material available on East Mesa, a major part of the effort on this project was devoted to studying the East Mesa field. One particular problem that first came to attention when studying the Cerro Prieto data was the difficulty in determining actual formation temperature at the time of logging. Since the temperature can have a significant effect on well log readings, an accurate temperature determination was considered to be important. (ERA citation 04:049825)

LBL-7001 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Study of the Structural Control of Fluid Flow within the Cerro Prieto Geothermal Field, Baja California, Mexico.
J. E. Noble, M. A. Manon, M. J. Lippmann, and P. A. Witherspoon. Oct 77, 18p CONF-771014-4
Contract W-7405-ENG-48
52. annual meeting of the Society of Petroleum Engineers, Denver, CO, USA, 9 Oct 1977.

The Lawrence Berkeley Laboratory and the Comision Federal de Electricidad of Mexico are conducting a joint investigation of the Cerro Prieto Geothermal Field, located approximately 35 km south of Mexicali, Baja California, Mexico, in the Sea of Cortez-Salton Trough. Recent analyses of various geophysical/electrical logs, temperature logs, production and geochemical data and the subsequently developed preliminary model of the structure of the geothermal system and the distribution of geothermal fluids are presented. Techniques routinely applied to petroleum exploration were successfully used in the development of a preliminary model of this water-dominated system. The study indicates the upwelling of geothermal fluids along an east bounding fault from a deep, as yet unexplored source. The fluids dissipate into various sand horizons at various depths. The resulting stratigraphic and fluid flow model is of importance in planning additional developments of the Cerro Prieto Geothermal Field. (ERA citation 04:049802)

LBL-8703 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Geothermal Energy Development from the Salton Trough to the High Cascades.
N. E. Goldstein. Jan 79, 15p CONF-790107-10
Contract W-7405-ENG-48
National conference and exhibition on technology for energy conservation, Tucson, AZ, USA, 22 Jan 1979.

The program in Geothermal Energy Development at the Lawrence Berkeley Laboratory is reviewed briefly. Current work in two contrasting geological environmts is discussed. These are the Cerro Prieto Geothermal Field and Mt. Hood volcano. (ERA citation 04:048480)

LBL-9056 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Numerical Model of Transient Two Phase Flow in a Geothermal Well.
C. W. Miller. Jul 79, 4p CONF-790906-6
Contract W-7405-ENG-48
Geothermal Resources Council annual meeting, Reno, NV, USA, 24 Sep 1979.

The one-dimensional transient two phase flow in a geothermal well has been modeled with a finite difference approximation. The equations of mass, momentum and energy are solved using a partially implicit method. Terms that would place a severe time restriction on the calculation are solved implicitly while other terms are solved explicitly for computational ease and efficiency. The wellbore model includes heat and mass transfer and is coupled to a simple reservoir model. It is used to investigate the transient behavior in a single or two phase well during well testing. Results show that when the reservoir has a relatively large value of kh, as exists in a geothermal field, the slope of the log (pressure) vs. log (time) curve is not necessarily a unit slope. The early time behavior of this curve is controlled by the interaction of the flow in the reservoir and that in the well, and can be used to determine near bore values of kh. Heat loss in the wellbore is shown to also affect the pressure vs. time plot. (ERA citation 04:049831)

NP-23800 PC **A03**/MF **A01**
Kingston, Reynolds, Thom and Allardice Ltd., Auckland (New Zealand).
Malitbog 1 Drilling Report: Geothermal Exploration Project.
Aug 78, 27p
U.S. Sales Only.

MBI is the seventh of twenty projected geothermal exploration and development wells to be drilled by the New Zealand Ministry of Foreign Affairs IDECO H-525D rig. It is the first well drilled in the Malitbog Valley which outside the 10 ohm-meter contour of the Schlumberger resistivity anomaly. The drilling of the well to 1665.0 m and th initial well completion tests are reported. (ERA citation 04:048495)

NP-23827 PC **A04**/MF **A01**
Kingston, Reynolds, Thom and Allardice Ltd., Auckland (New Zealand).
Mahiao 1 Evaluation Report: Geothermal Exploration Project.
May 78, 65p
U.S. Sales Only.

Mahiao 1 was drilled to test the geothermal potential of the upper Mahiao valley. This follows a program of scientific investigation, and the drilling of twelve shallow temperaure gradient wells during the previous three years, in the area generally known as the Tongonan Geothermal Area. The well bottomed in an intrusive complex after penetrating 1600 m to 1700 m of the Bao Volcanic sequence. Downhole temperatures below 1490 m C.H.F. exceed 300 exp 0 C with a maximum temperature at 1793 m C.H.F. of 324 exp 0 C. The well became progressively blocked with fill thereby preventing further measurements being made below 1814 m C.H.F. The chemistry of the discharged fluids indicated a neutral pH, low bicarbonate, high chloride, highly mineralized (approx. 3% T.D.S.) water. Total gas content of the separated steam

was 1.01% by volume of which CO sub 2 and H sub 2 S constituted 99.55% by weight. The well is currently being used to provide steam to a 3 MW non-condensing turbine operated by the National Power Corporation. (ERA citation 04:048489)

NP-23828 PC **A03**/MF **A01**
Kingston, Reynolds, Thom and Allardice Ltd., Auckland (New Zealand).
Mahiao 2 Drilling Report: Geothermal Exploration Project.
Apr 78, 36p
U.S. Sales Only.

M2 is the second of twenty projected geothermal exploration and development wells to be drilled with the New Zealand ministry of foreign affairs IDECO H-525D Rig. The drilling of the well to 1901.9 m and the initial completion tests are reported. (ERA citation 04:048496)

NP-23830 PC **A03**/MF **A01**
Kingston, Reynolds, Thom and Allardice Ltd., Auckland (New Zealand).
Mahiao 3 Drilling Report: Geothermal Exploration Project.
Aug 78, 32p
U.S. Sales Only.

M3 is the fourth of twenty projected geothermal exploration and development wells to be drilled with the New Zealand Ministry of Foreign Affairs IDECO H-525D Rig. The drilling of the well to 1405.45 m and the initial completion tests performed prior to releasing the rig are reported. (ERA citation 04:048497)

NP-23831 PC **A03**/MF **A01**
Kingston, Reynolds, Thom and Allardice Ltd., Auckland (New Zealand).
Mahiao 4 Drilling Report: Geothermal Exploration Project.
Jul 78, 36p
U.S. Sales Only.

M4 is the third of twenty projected geothermal exploration and development wells to be drilled with the New Zealand Ministry of Foreign Affairs IDECO H-525D Rig. The drilling of the well to 1669.70 m and the initial completion tests performed prior to releasing the rig are reported. (ERA citation 04:048498)

PB80-100696 PC **A02**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Mining and Safety Research Center.
Forecasting Methane Hazards in Metal and Nonmetal Mines.
Rept. of investigations,
Edward D. Thimons, Robert P. Vinson, and Fred N. Kissell. 1979, 14p BUMINES/RI-8392

Because of the high number of accidental methane gas ignitions in metal and nonmetal mines, the Bureau of Mines searched for a simple guideline that would allow mine personnel to evaluate the methane hazard in a given mine. Air samples were collected by the Bureau in 53 metal and nonmetal mines and analyzed for trace evidence of methane gas. Samples were collected in the returns and at the working faces. Those mines classified as gassy by the Mine Safety and Health Administration had a significantly higher average methane concentration than those classified as nongassy. Of the 9 gassy mines sampled, 7 had methane concentrations above 100 ppm, whereas only 1 of the 44 nongassy mines had a concentration above 100 ppm. The 100-ppm concentration may be used as a simple and convenient guideline for forecasting the methane hazard in a mine, whether or not the mine is classified as gassy. There was no consistent correlation between commodity mined and methane concentration, nor was there a correlation between mine depth and methane concentration. Neither of these factors can be considered a guideline for predicting methane hazards.

PB80-101611 PC **A02**/MF **A01**
Bureau of Mines, Washington, DC.
Asbestos,
Robert A. Clifton. Jul 79, 25p
See also report dated Sep 77, PB-272 916. Report on Mineral Commodity Profiles.

The Bureau of Mines report presents comprehensive data on asbestos including industry structure, uses, reserves-resources, technology, supply-demand relationships, strategic considerations, economic factors and problems, operating factors and problems, and outlook to 2000.

PB80-102072 PC **A03**/MF **A01**
Bureau of Mines, Washington, DC.
Sulfur,
John E. Shelton. Jul 79, 32p
Report on Mineral Commodity Profiles.

Sulfur is one of the most important of the industrial raw materials. In one way or another it is of prime importance to every sector of the fertilizer and industrial complexes of the world. Its consumption is generally regarded as one of the best indexes of a nation's industrial development. The Bureau of Mines report presents comprehensive data on sulfur including industry structure, uses, reserves-resources, technology, supply-demand relationships, byproducts and coproducts, strategic considerations, economic factors and problems, operating factors and problems, and outlook to 2000.

PB80-106479 PC **A06**/MF **A01**
State Univ. of New York at Stony Brook. Marine Sciences Research Center.
Textural Properties of Surficial Sediments of Lower Bay of New York Harbor.
Special rept.,
Clifford R. Jones, Charles T. Fray, and J. R. Schubel. Mar 79, 121p SR-21, REF-79-4, NOAA-79091302

The objective of this report is to describe the textural properties of the surficial sediments of the Lower Bay of New York Harbor. The grain size distributions are summarized in tabular form. Figures summarize the spatial distributions of selected statistical parameters: median diameter, mean diameter, standard deviation, skewness, and kurtosis. A figure delimits 25 areas in the Lower Bay of New York Harbor on the basis of sediment texture. The textural properties of samples within each of these 25 areas are summarized in tables.

SAN-2069-1 PC **A03**/MF **A01**
Texas Univ. at Austin.
Support Research on Chemical, Mechanical, and Environmental Factors in Underground Coal Gasification. Quarterly Report, January 1, 1979.
T. F. Edgar, M. J. Humenick, T. W. Thompson, and K. E. Gray. 1 Jan 79, 50p
Contract ET-78-S-03-2069

Three subprojects in chemical engineering research have been undertaken with DOE support. They include thermal cracking of tars, combustion tube operation, and mathematical modeling. However, there are actually a total of eight different subprojects underway, including lignite pyrolysis, char gasification, char oxidation, linear combustion rates, and cavity tracer analysis, in addition to the three mentioned earlier. These projects are intimately related to each other and have been undertaken with support of private industry. A brief status report is given on the three DOE sponsored research projects. An adequate knowledge of the thermal properties of the rocks forming a gasification chamber is needed for many areas of gasification simulation. Thus the thermal conductivity is needed to determine temperature fields within the lignite, and in the over and underlying rocks, to allow calculation of heat losses and process development. This parameter, together with the thermal expansion coefficient of the rock, is needed to calculate the thermal stressing effect. The influence of reaction temperatures on the stress field around a gasification chamber is illustrated by considering a simplified model. The three lignite samples under investigation have been ashed and charred at the appropriate temperature for study. Extractions at 20 exp 0 C using simulated groundwater have been completed for the prepared materials at two of the three burn temperatures. One series of extractions have been analyzed for inorganic releases. This data is being analyzed. Extractions of char samples have also been analyzed for both inorganic and organic releases. (ERA citation 04:049444)

SAND-79-0787 PC **A04**/MF **A01**
Sandia Labs., Albuquerque, NM.
Solar Enhanced Oil Recovery; an Assessment of Economic Feasibility.
K. D. Bergeron. May 79, 56p
Contract EY-76-C-04-0789

There are several qualitative reasons why steam injection enhanced oil recovery (EOR) appears to be well suited to solar energy. These include favorable characteristics with regard to energy utilization, land availability, energy form, and geographical location. A number of technical questions require further research before the characteristics of solar enhanced oil recovery (SEOR) can be precisely specified or optimum systems designed. However, a cost model based on a number of working assumptions indicates competitiveness with conventional fuel burning EOR systems at crude prices and solar collector system costs which can reasonably be expected to occur in the near future. (ERA citation 04:048104)

UCID-18096 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Permeability Enhancement Methods for Preparing a Coal Bed for In Situ Coal Gasification.
R. W. Hill. 10 Apr 79, 29p
Contract W-7405-ENG-48

Seven methods of borehole linking, or permeability enhancement, are discussed; others undoubtedly could be included. A linking method should meet these requirements: (1) it must be a reliable procedure that gives good control of the subsequent gasification, and (2) it must be as inexpensive as possible. Of the methods discussed, reverse combustion combined with pneumatic or hydraulic fracturing is the most successful. However, directional drilling could become the best choice as technology improves and cost decreases. (ERA citation 04:048056)

UCRL-52576 PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Water for Long-Term Geothermal Enegy Production in the Imperial Valley.
D. W. Layton. 22 Sep 78, 51p
Contract W-7405-ENG-48

The geothermal resources of California's Imperial Valley have the potential for the production of an estimated 3000 to 5000 MW/yr of electricity for 30 yr, provided that adeuqate cooling water is available for power plants. There are five possible sources of cooling water: irrigation water, waste waters from agriculture, steam condensate, ground water, and water from the Salton Sea. Technical, environmental, and regulatory constraints, however, could limit the availability of the water supplies. Of particular concern are the constraints that could be imposed if different water policies were implemented. To study how future policies could affect geothermal development, six combinations of various policies were defined to represent potential regulatory controls. A range of future water balances in the valley was also specified. The water balances plus the six policy combinations were used to determine whether deficits of cooling water would eventually constrain low, medium, or high levels of geothermal energy production. A companion analysis of changes in the elevation and salinity of the Salton Sea resulting from the use of agricultural waters for cooling was also made. (ERA citation 04:048494)

UCRL-52664 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Evaluation of Materials Exposed to Scale-Control/Nozzle-Exhaust Experiments at the Salton Sea Geothermal Field.
A. Goldberg, and R. P. Kershaw. 8 Feb 79, 46p
Contract W-7405-ENG-48

The erosion, corrosion, and stress corrosion cracking (SCC) of Ti-, Co-, Ni-, and Fe-base alloys specimens that were used in scale-control tests performed at the Salton Sea geothermal field were evaluated. Specimens were exposed to high-velocity, two-phase, 104 exp 0 C nozzle exhaust that was produced by expanding acidified hypersaline, highly mineralized brine to atmospheric pressure through converging-diverging nozzles. The exposed specimens were evaluated using surface

profilometer traces, light microscopy, scanning-electron microscopy, and energy dispersive spectroscopy ananlysis. The observed degradation was attributed largely to synergistic effects of erosion, corrosion, and stress. A principal mode of degradation appeared to be the formation and growth of corrosion-assisted erosion cavities; it was proposed that surface repassivation kinetics play a key role in the development of these cavities. It was also suggested that scale deposits on the metal surface may either alter the mode of attack or act as protective barriers. It was concluded that, of the potential turbine-blade materials tested, the Ti-base alloys exhibited the best combination of resistance to erosion, corrosion, and SCC. (ERA citation 04:048500)

UCRL-52684 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Northern California Power Association--Shell Oil Company Geothermal Project No. 2: Energy and Materials Resources.
C. H. Hall, and Y. E. Ricker. Jan 79, 12p
Contract W-7405-ENG-48

The potential environmental impact of the energy and material resources expended in site preparation, construction, operation, maintenance, and abandonment of all phases of the Northern California Power Association--Shell Geothermal Project in The Geysers--Calistoga Known Geothermal Resource Area is described. The impact of well field development, operation, and abandonment is insignificant, with the possible exception of geothermal resource depletion due to steam withdrawal from supply wells during operation. The amount of resource renewal that may be possible through reinjection is unknown because of uncertainties in the exact amount of heat available in the steam supply field. Material resources to be used in construction, operation, and abandonment of the power plant and transmission lines are described. Proposed measures to mitigate the environmental impacts from the use of these resources are included. Electric power supply and demand forecasts to the year 2005 are described for the area served by the NCPA. (ERA citation 04:049827)

UCRL-82814 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Silica Control and Materials Tests at the Salton Sea Geothermal Field.
R. Quong, J. E. Harrar, R. D. McCright, R. D. Locke, and L. E. Lorensen. 7 Jun 79, 9p CONF-790679-1
Contract W-7405-ENG-48
Annual EPRI geothermal conference, Monterey, CA, USA, 26 Jun 1979.

The Lawrence Livermore Laboratory maintains and operates a test facility near Niland, California, in the Imperial Valley for field studies on SSGF brine chemistry, scale and solids control, materials, and injection. Recent work in silica control and materials testing is reviewed. (ERA citation 04:048501)

8J. Physical Oceanography

AD-A073 925/0 PC **A07**/MF **A01**
Naval Postgraduate School Monterey CA
Coastal Controls on Vertical Sound Speed Determination and Corrections to Echo Soundings.
Master's thesis,
David Winston Yeager. Jun 79, 131p

Present methods for determining sound speed corrections for echo soundings in continental shelf areas are time-consuming and expensive. This study was undertaken to determine whether or not sound speed correctors of sufficient accuracy could be deduced from historical data. Historical sound speed data for an east coast shelf area indicates that temporal and spatial variability exceeds acceptable limits for sounding corrections, thus precluding the use of historical data only for corrector determination. Examination of temperatures and salinity data indicates that historical salinity values in the region are sufficiently stable to allow acceptable sound speed corrections to be made derived on the basis of in-situ temperature measurement and historically derived salinity values. Expendable bathythermograph probes are capable of meeting temperature requirements. The constancy of the T-S relation in such regions may allow salinity determination from water temperatures alone. (Author)

AD-A074 095/1 PC **A06**/MF **A01**
Hawaii Inst of Geophysics Honolulu
Report of Work Accomplished in Support of PARKA II Operations.
Interim technical rept. no. 3, May-Oct 69,
R. C. Latham, Romondt Budd, and R. G. Zachariadis. 10 Nov 69, 102p
Contract N00014-67-A-0387-0004

The report entitled 'Oceanographic Parameters for Acoustical Determination Between Latitude 22 deg N and 30 deg N Along the 157 deg 50 min West Meridian' described a one-year environmental study made between May 1968 and April 1969. This interim report describes the work accomplished from May 1969 through October 1969. The results of five ship cruises are reported which confirm the variability of the near-surface ocean environment in the area. A definite temperature inversion in the deep ocean below about 3800 meters depth is described. Several bathymetric profiles are presented, the results of current observations near the Sea Spider site are reported and the results from analysis of three cores taken by USNS SANDS at the Sea Spider site are reported. (Author)

AD-A074 097/7 PC **A07**/MF **A01**
Office of Naval Research Arlington VA
Techniques for Infrared Survey of Sea Temperature.
28 Apr 64, 147p
Report of a workshop held at the U.S. Department of the Interior, Washington, DC. 27-28 April 1964. Also available as circular-202 dated Nov 64, Bureau of Sport Fisheries and Wildlife, Highlands, NJ. Sandy Hook Marine Lab.

The Workshop on Techniques for Infrared Survey of Sea Temperature was held to evaluate the state of the art of measuring sea surface temperatures with infrared detecting equipment. The simplest form of detector, the infrared thermometer (IRT), is calibrated to give direct read-out of surface temperature. Because this instrument is now a stock item and relatively inexpensive, there has been a rapid increase in its use in oceanographic and limnological survey. An opportunity to exchange information on techniques and interpretation of readings appeared to be needed because there was little information in print with which to evaluate the usefulness of IRT survey.

AD-A074 131/4 PC **A03**/MF **A01**
Columbia Univ Dobbs Ferry NY Hudson Labs
Summary of Research on the Atlantic Shelf and Adjoining Coastal Areas Carried out at Hudson Laboratories in 1965-66.
Summary rept.,
John E. Sanders. 22 Dec 66, 29p Rept no. INFORMAL DOCUMENTATION-123
Contract Nonr-266(84)

This report summarizes research related to the Atlantic continental shelf being carried out at Hudson Laboratories of Columbia University, Dobbs Ferry, New York. Discussion is organized under the following headings: sampling apparatus, laboratory apparatus and techniques, lateral echo-sounding, field studies, results of laboratory studies, and computer programs.

AD-A074 135/5 PC **A02**/MF **A01**
Naval Research Lab Washington DC
Radio Controlled Water Sampling Buoy.
Memorandum rept.,
Arthur D. Swanson, and Robert C. Beckett. Dec 63, 11p Rept no. NRL-MR-1480

This report describes a specially designed ocean surface sampling buoy that is operated by remote control. A four-channel radio transmitter and receiver is used with additional electronics to operate this buoy at approximately 1000 yards. The buoy has a capacity for collecting up to 18 liters of surface water. A method of deploying the buoy from a small boat is discussed along with a flash bulb triggering system that gave a very high efficiency rating. (Author)

AD-A074 153/8 PC **A03**/MF **A01**
Electronics Research Lab Adelaide (Australia)
The Influence of Water Turbidity on the Performance of a Laser Airborne Depth Sounder.
Technical rept.,
D. M. Phillips. Apr 79, 29p Rept no. ERL-0072-TR

During flight trials of a laser airborne depth sounder (WRELADS), measurements were made of the optical attenuation coefficient of coastal waters in both South Australia and Queensland. Measurements of the attenuation coefficient at wavelengths from 400 nm to 600 nm are reported for a range of different water types, and the suitability for depth sounding of the laser wavelength 532 nm is confirmed. Variations of the attenuation coefficient at 530 nm over two vertical sections of sea water are reported and factors influencing the turbidity are suggested. Return signals recorded by the depth sounder are compared with measured attenuation coefficients of the water. It is shown that the maximum measurable water depth varies from below 4 to above 10 attenuation lengths, depending on the turbidity of the water. (Author)

AD-A074 161/1 PC **A05**/MF **A01**
Assembly of Engineering Marine Board, Washington, DC.
Engineering at the Ends of the Earth. Polar Ocean Technology for the 1980's.
1979, 87p
Contract N00014-77-C-0728

Ocean engineering operations in polar waters, particularly in the Arctic, will increase during the foreseeable future as efforts continue to recover commercially valuable resources such as petroleum, fish, and various minerals. The establishment of the 200-mile economic zone already has resulted in a marked increase in the number and capability of fishing ships in the Arctic. A sale of leases for the exploration and production of oil and natural gas in the Beaufort Sea is scheduled for late 1979. The petroleum industry is rapidly expanding its technological base in Alaska and Northern Canada. Mining and other operations are planned for Greenland. In the Antarctic, krill resource assessment and experimental fishing projects are being undertaken by several countries in preparation for large-scale development. In addition to U.S. activities, other nations-notably Canada, the Soviet Union, Japan, West Germany, and Norway--are investing substantial funds in developing polar ocean engineering technologies. This report is a review of polar ocean engineering research and technology that are considered necessary to support of commercial and scientific operations during the decade of the 1980's. In presenting the panel's view of the critical national needs in polar ocean engineering, the report identifies and examines the technical deficiencies in today's state of the art and recommends ways of improving the situation.

AD-A074 179/3 PC **A13**/MF **A01**
Woods Hole Oceanographic Institution MA
Volatile Organic Compounds in Seawater.
Technical rept.,
Philip M. Gschwend. Sep 79, 277p Rept no. WHOI-79-72
Contract N00014-74-C-0262, Grant NOAA-04-7-158-44104
Doctoral thesis. Sponsored in part by Grant NOAA-04-8-MO1-149.

Vapor phase stripping and solid adsorbent trapping were applied to seawater and related samples to concentrate volatile organic compounds. The concentrates were subsequently analyzed by glass capillary gas chromatography and combined gas chromatography-mass spectrometry. The compound identifies and the spatial and temporal distributions of their concentrations were used to determine some sources, transformations, and transport mechanisms of organic matter in the sea. Volatile organic compounds were determined in seawater samples from the Sargasso Sea, the western Equatorial Atlantic, and the upwelling region off Peru. Pentadecane was present in all three areas in surface samples of 10-40 ng/kg and decreased to 1-2 ng/kg in the deep water. A source related to the transformation of the algal

fatty acid, hexadecanoic acid, by zooplankton is proposed since anthropogenic and direct phytoplankton sources are unlikely. C2-alkylated benzenes were found in the upwelled water off Peru at about 4 ng/kg in the surface (5 and 20m), 3 ng/kg below the thermocline (100m), and 2 ng/kg or less in deeper water. A surface or atmospheric source is required to produce this distribution. C6-C10 aldehydes were also found in seawater from off Peru. The direct correlation of their concentrations with chlorophyll a and with oxygen indicated that they are derived from chemical oxidation of algal metabolites, for example, unsaturated fatty acids. Total volatiles in the oligotrophic Sargasso Sea were about 10-30 ng/kg while the biologically productive upwelling region off Peru contained up to 100 ng/kg.

AD-A074 186/8 PC **A05**/MF **A01**
Naval Postgraduate School Monterey CA
A Study of the Relationship Between Oceanic Chemical Mesoscale and Sea Surface Thermal Structure as Detected by Satellite Infrared Imagery.
Master's thesis,
Don Alan Nestor. Jun 79, 93p

In recent years the study of ocean fronts and eddies has become increasingly important to the U.S. Navy for they are of vital importance in understanding underwater sound transmission. From the history of satellite pictures for the area of the ocean off the central California coast, it appears that cold water which has come to the surface as a result of upwelling has become intertwined within the California Current. The persistent thermal features in the sea surface which are formed were the subject area of this study. Direct telephone contact was established with the satellite receiving station which afforded real time sateilite information as to the thermal structure of the sea surface on a mesoscale. This satellite sensed thermal structure was then compared with in situ nutrient and temperature data collected on three cruises on board the research vessel ACANIA. The agreement between the in situ data and the satellite imagery was very strong and the utilization of satellite imagery was shown to be a very effective method to localize an ocean front.

AD-A074 274/2 PC **A06**/MF **A01**
Oregon State Univ Corvallis School of Oceanography
Towed Thermistor Chain Observations during MILE.
Data rept.,
T. J. Spoering, C. A. Paulson, D. Denbo, and J. Wagner. Jul 79, 106p Rept nos. DATA-74, REF-79-11
Contracts N00014-76-C-0067, N00014-79-C-0004

Observations of temperature between 20 and 40 m depth were made with a towed thermistor chain in the North Pacific (50N, 145W) during the Mixed Layer Experiment (MILE). The chain was usually towed at a speed of 3 m/s around a 20 km square on alternate days for a three-week period beginning on August 1977. The observations were averaged over sequential 30-second intervals and isotherm depths were interpolated from the averaged observations. Plots of temperature and isotherm depth are presented. The plots show the horizontal variability of temperature in the well-mixed layer and the vertical displacement of isotherms induced by internal waves in the thermocline. (Author)

SAND-79-0036C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Development of in Situ Marine Seismic and Geotechnical Instrumentation Systems.
E. W. Reece, D. E. Ryerson, J. D. Kestly, and R. L. McNeill. 1979, 14p CONF-790833-1
Contract EY-76-C-04-0789
International conference on port and ocean engineering under Arctic conditions, Trondheim, Norway, 13 Aug 1979.

A unique pair of in-situ marine geotechnical instrumentation systems, capable of operating unattended for extended periods of time in remote locations, have been designed, fabricated, and are currently undergoing testing. The Seafloor Earthquake Measurement System (SEMS) measures the response of marine sediments to strong and moderate seismic activity. The Geotechnically Instrumented Seafloor Probe (GISP) measures the in-situ pore pressure in soft marine clays. The two systems have many common characteristics. Both systems consist of two principal subsystems: a seafloor data-gathering package and a shipboard command and recording package. The seafloor packages are totally self-contained and incorporate microprocessor-based electronics which control data collection, processing, and storage. Data collected and stored by the seafloor packages are transmitted on command to the command and recording package via a high-data-rate acoustic telemetry system. This paper describes the design, development and testing of the Seafloor Earthquake Measurement System and the Geotechnically Instrumented Seafloor Probe. Data are presented and discussed. Advanced concepts for future marine geotechnical instruments are discussed. (ERA citation 04:049085)

8K. Seismology

AD-A074 008/4 Not available NTIS
Lamont-Doherty Geological Observatory Palisades NY
Microseisms at Palisades: 1. Source Location and Propagation,
D. H. Rind, and W. L. Donn. 22 Sep 77, 11p
LDGO-2668, ARO-14846.5-GS
Contract DAAG29-77-G-0131, Grant NSF-ATM-09449
Availability: Pub. in Jnl. of Geophysical Research, v83 nB7 p3525-3534, 10 Jul 78 (No copies furnished by DDC).

No abstract available.

AD-A074 014/2 PC **A04**/MF **A01**
Teledyne Geotech Alexandria VA Seismic Data Analysis Center
PKP Travel Times and B Factors.
Technical rept.,
Andre C. Chang, and John W. Lambert. 24 Oct 78, 56p Rept no. SDAC-TR-78-9
Contract F08606-79-C-0007, ARPA Order-2551

Using Jordan and Anderson's earth model B1, the author calculated theoretical travel times, depth allowance tables, branch interval times, and B factors for all PKP phases; the results are in tabular form. Travel times are calculated with polynomial approximations, and those coefficients are also computed. New additions to those tables are the data for the CD branch, which are the PKiKP arrivals in the distance range of 109 to 158 deg. Although travel times of the CD branch fall within a few seconds of the travel times of the DF branch, amplitudes of the CD branch signals are larger than those of the DF branch signals in most of the covering range. Discrepancies of theoretical travel times from the table based on Bolt's observations are calculated to show that tables presented here are adequate for practical use. (Author)

AD-A074 066/2 Not available NTIS
Hawaii Inst of Geophysics Honolulu
Spectral Analyses of High-Frequency P sub n and S sub n Phases Observed at Great Distances in the Western Pacific,
Daniel A. Walker, Charles S. McCreery, George H. Sutton, and Frederick K. Duennebier. 12 Oct 77, 4p
Contract N00014-75-C-0998
Availability: Pub. in Science, v199 p1333-1335, 24 Mar 78 (No copies furnished by DDC.)

No abstract available.

AD-A074 067/0 Not available NTIS
Hawaii Inst of Geophysics Honolulu
High-Frequency P sub n Phases Observed in the Pacific at Great Distances,
Daniel A. Walker. 14 Sep 76, 4p
Contract N00014-75-C-0998
Availability: Pub. in Science, v197 p257-259, 15 Jul 77 (No copies furnished by DDC).

No abstract available.

N79-31864/8 PC **A12**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Application of Space Technology to Crustal Dynamics and Earthquake Research.
Aug 79, 274p NASA-TP-1464

In cooperation with other Federal government agencies, and the governments of other countries, NASA is undertaking a program of research in geodynamics. The present program activities and plans for extension of these activities in the time period 1979-1985 are described. The program includes operation of observatories for laser ranging to the Moon and to artificial satellites, and radio observatories for very long baseline microwave interferometry (VLBI). These observatories are used to measure polar motion, earth rotation, and tectonic plate movement, and serve as base stations for mobile facilities. The mobile laser ranging and VLBI facilities are used to measure crustal deformation in tectonically active areas.

N79-31865/5 PC **A05**/MF **A01**
European Space Agency, Paris (France).
Definition of a European Program for Earthquake Prediction Research.
T. D. Guyenne. Apr 79, 97p SP-149
Conf-Presented at ESA/Council of Europe Seminar, Strasbourg, 5-7 Mar. 1979.

No abstract available.

PB80-102056 PC **A05**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.
Baseline Correction of Earthquake Records in the Frequency Domain.
Research rept.,
E. Kausel, and R. Ushijima. Jul 79, 85p MIT-CE-R79-34, NSF/RA-790180
Grant NSF-ENV77-18339

The report examines various integration schemes for discrete functions in the frequency domain, and develops procedures to perform a parabolic baseline correction to earthquake records in this domain. Only for acceleration records having zero mean value over the interval of definition does the simplest integration scheme analyzed (the pseudo-continuous method) coincide with the well known integration procedure of dividing the Fourier Transform of the record by i omega. Records with non-zero mean, on the other hand, require additional terms to achieve consistency with time domain procedures such as the trapezoidal rule. The formulae developed are then applied in the last section of the report to the Golden Gate Earthquake of March 22, 1957, and compared against each other.

PB80-106719 PC **A06**/MF **A01**
World Data Center A for Solid Earth Geophysics, Boulder, CO.
Survey of Practice in Determining Magnitudes of Near Earthquakes. Part 1: North, Central, and South America,
W. H. K. Lee, and R. J. Wetmiller. Jan 78, 108p SE-9, NOAA-79091201
See also Part 2, PB-271 291. Prepared in cooperation with Geological Survey, Menlo Park, CA.

The report is part of a plan to make data-related information conveniently available to the scientific community; in this case we are presenting the practices used by various groups in determining the magnitudes for near earthquakes. This information has been compiled under the auspices of the IUGG/IASPEI (International Union of Geodesy and Geophysics/International Association of Seismology and Physics of the Earth's Interior) Commission on Practice and is being reprinted by WDC-A for Solid Earth Geophysics as one of its data services. Part 1 covers North, Central, and South America.

PB80-107196 PC **A08**/MF **A01**
World Data Center A for Solid Earth Geophysics, Boulder, CO.
Manual of Seismological Observatory Practice,
P. L. Willmore. Sep 79, 165p SE-20, NOAA-79092102
Prepared in cooperation with Institute of Geological Sciences, Edinburgh (Scotland).

The report is a manual of seismological observatory practice, in which the basic duties of the observatory are envisaged as follows: (1) To maintain

equipment in continuous operation, with instruments calibrated and adjusted to conform with agreed standards; (2) to produce records which conform with necessary standards for internal use and international exchange; and (3) to undertake preliminary readings needed to meet the immediate requirements of data reporting. The opening chapters are intended for the guidance of a potential network authority, and are concerned with the problems of building and equipping various types of station. Later sections deal with operation, and are intended to lead to the production of original records and of numerical readings of the highest possible quality and degree of standardization.

8M. Soil Mechanics

PB80-100613 PC **A08**/MF **A01**
Florida Univ., Gainesville. Dept. of Civil Engineering.
Guidelines for Cone Penetration Test, Performance and Design.
Final rept.,
John H. Schmertmann. Jul 78, 152p FHWA/TS-78/209

The manual includes: (1) Introduction and review of the general principals concerning cone penetrometer testing; (2) Individual design chapters which address topics such as pile design, shear strength estimation, settlement calculation and compaction control; (3) Appendices which present previously published, pertinent information on cone penetrometer testing.

PB80-102411 PC **A12**/MF **A01**
Iowa State Univ., Ames. Engineering Research Inst.
Chemical Compaction Aids for Fine-Grained Soils. Volume II.
Final rept.,
James M. Hoover, and Richard L. Handy. Jun 78, 268p FHWA/RD-79/64
Contract DOT-FH-11-8135
See also Volume 1, dated Jun 79, PB-301 115.

The report includes moisture-density-strength screening tests performed on several additional chemicals and an evaluation of the standard AASHTO T-99 moisture-density test results performed on soil specimens prepared under varying conditions of drying, pulverization, and re-use. Theory and applicability of project use of the Iowa K-Test for determination of cohesion, angle of internal friction, lateral stress ratio, and other soil parameters obtained from 1/30 cu ft specimens are described. Also presented are the Phase II laboratory moisture-density strength study of chemicals selected primarily from Phase I as evaluated through both qualitative and statistically related procedures, laboratory compaction growth, and 7-day moist cure results, and a discussion of the mechanisms of chemical compaction aids as evaluated through the assistance of infrared spectrography, vapor pressure osmometer, and zeta potential tests. Based on the total study, an 'ideal' compaction aid is described. Phase III presents results of field trials conducted on a roadway embankment near Knoxville, Marion County, Iowa, and a soil-aggregate base near Villanueva, New Mexico.

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

AD-A073 862/5 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
The Silicon Cryosar at Microwave Frequencies,
Lance A. Glasser, and Robert L. Kyhl. 21 Mar 77, 7p
Contract DAAB07-75-C-1346
Pub. in IEEE Transactions on Electron Devices, vED-26 n6 p966-970 Jun 79.

No abstract available.

AD-A073 867/4 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
Microwave Characterization of Silicon BARITT Diodes under Large-Signal Conditions,
Gary K. Montress, and Madhu Sudan Gupta. 22 May 78, 7p
Contract DAAG29-78-C-0020
Pub. in IEEE Transactions on Microwave Theory and Techniques, vMTT-27 n5 p458-462 May 79.

No abstract available.

AD-A074 035/7 PC **A02**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Anomalous Noise Behavior in Wide-Bandwidth Photodiodes in Heterodyne and Background-Limited Operation.
Journal article,
David L. Spears, and Robert H. Kingston. 3 Jan 79, 3p JA-4902, ESD-TR-79-174
Contract F19628-78-C-0002
Pub. in Applied Physics Letters, v34 n9 p589-590, 1 May 79.

No abstract available.

AD-A074 279/1 Not available NTIS
Kentucky Univ Lexington Dept of Electrical Engineering
A Generalized Spectral Domain Analysis for Coupled Suspended Microstriplines with Tuning Septums,
Tatsuo Itoh, and Albert Sidney Hebert. 11 Nov 77, 7p ARO-15465.2-EL
Grant DAAG29-77-G-0220
Availability: Pub. in IEEE Transactions on Microwave Theory and Techniques, vMTT-26 n10 p820-826 Oct 78. (No copies furnished by DDC).

No abstract available.

CONS-3007-T2 PC **A02**/MF **A01**
Westinghouse Electric Corp., Muncie, IN. Large Power Transformer Div.
Advanced Concepts for a 1200 KV Shunt Reactor. First Quarterly Progress Report, 28 September 1978--31 December 1978.
1978, 14p
Contract ET-78-C-01-3007

The objective of this program is to explore new concepts for inductive shunt reactor designs for integration into a 1200 kV gas-insulated substation. The most promising design must exhibit low dimensional profile with reduced weight, lower losses, lower noise level and smaller amplitude of vibration when compared with the units of equivalent rating built with the present day technology. The planning and organization of this research program are described. (ERA citation 04:049862)

N79-31515/6 PC **A10**/MF **A01**
Sira Inst. Ltd., Chislehurst (England).
Evaluation of Linear Self-Scanning Imaging Arrays.
Final Report.
D. J. Purll, and J. A. Smith. Jan 79, 220p SIRA-6/5071/00, ESA-CR(P)-1197
Contract ESTEC-3414/77

Some properties of linear charge coupled devices (CCD) and photodiode imaging arrays were investigated. Four properties were tested, namely the aperture response of individual elements, response nonuniformity, dark current nonuniformity, and readout noise. Information was sought principally for future progress of the High Accuracy Sun Sensor project, but is expected to be useful in other applications, such as earth imaging from space. Seven devices were tested: GEC MA338X; Reticon CCPD 1024, CCPD 256, RL 256G and RL 256 C17; and Fairchild CCD 131 and CCD 110F. The above-mentioned properties were tested where appropriate under variable conditions of light color, light level, integration time, and temperature. Aperture responses of individual elements were mapped by scanning a small spot of light across the elements. For a particular array and light color the aperture responses were found to be very repeatable along the array, and no irregularities apart from those due to dirt were found. Interpolation of positional information of an accuracy of much better than the element spacing is therefore possible, using error techniques between adjacent elements or element groups. Cross-talk was found to increase with wavelength as expected. Noise measurements suggest that if noise equivalent signals of around 100 to 200 electrons are required, only Fairchild arrays can be used of those commercially available. Other CCD and CCPD arrays have noise around an order of magnitude lower than the photodiode arrays which were tested.

N79-31516/4 PC **A04**/MF **A01**
Thomson-CSF, Velizy (France). Div. Tubes Electroniques.
Development of an Improved Carcinotron in the Far Infrared Range.
Final Report.
G. Kantorowicz. Mar 79, 57p TR-2091-T, ESA-CR(P)-1202
Contract ESTEC-3294/77-NL-AK

The improvement of a Carcinotron (Backward Wave Oscillator) working around a wavelength of 0.85 mm 20 percent tunability range is discussed. A gun was designed in order to increase the tuning bandwidth and the tube was tested with a lighter Samarium-Cobalt magnet. The tuning range achieved was increased by a factor of 1.35 as compared to the previous tube measurements inside a conventional Ticonal magnet and is comparable to the range measured when operating a previous model with an electromagnet. The mass of the magnet was reduced by a factor of three by use of the Samarium-Cobalt magnet.

PAT-APPL-6-050 272 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Oxide Passivated Mesa Epitaxial Diodes with Integral Plated Heat Sink.
Patent Application,
Herbert Goronkin. Filed 19 Jun 79, 10p AD-D006 305/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention is directed to a semiconductor device and a method by which the device may be fabricated. The device comprises an oxide passivated mesa epitaxial diode with an integral heat sink and is fabricated in such a manner that the junction is passivated by the thermal growth of an oxide layer over the junction region without causing a reaction between the contact metals and the surrounding environment. In one form, the diode takes the shape of a mesa upon a supporting structure of thermally conductive metal, the latter serving both as an electrical contact and thermal heat sink. Directly upon the metallic base is the first semiconductor layer of the mesa, a heavily doped material of the first conductivity type. Covering the latter layer of the mesa is a layer of lightly doped material of the second conductivity type, opposite that of the first, forming therebetween a pn junction. Upon the lightly doped layer is a heavily doped layer of the same conductivity type, which is covered, at the mesa top, by a metallic contact. The side walls of the mesa structure, particularly in the region of the pn junction, are covered by a layer of highly pure SiO2 material. The resultant device has low thermal and electrical resistance without sacrificing the quality of the surface passivation at the pn junction. (Author)

PATENT-4 149 170 Not available NTIS
Department of the Army Washington DC
Multiport Cable Choke.
Patent,
Donn V. Campbell, and James J. Arnold. Filed 28 Apr 78, patented 10 Apr 79, 9p AD-D006 351/1, PAT-APPL-900 831
Supersedes PAT-APPL-900 831-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent concerns a unitary broadband high impedance isolation section for a plurality of closely spaced antennas, as well as other electrical apparatus, wherein the respective separate coaxial cables feeding the antennas and the shielded multi conductor cable for the other electrical apparatus are wound in the same direction on a common core and have the same number of turns, with the shields or outer conductors of all the cables being respectively connected together at the beginning and the end of the windings. The multiport cable choke thus configured can be provided with respective connectors at each end of the choke for

facilitating ease of installation into the electrical system, that is, a single multiport cable choke can be inserted in the feed lines of multiple antennas and other electrical equipment simply by means of making suitable interconnections by way of the connectors on both sides of the multiport cable choke assembly. Further, the multiport cable choke can be contained in a suitable dielectric housing enveloping the common core and the cable windings and the connectors can be mounted in this housing. (Author)

PATENT-4 149 308 Not available NTIS
Department of the Army Washington DC
Method of Forming an Efficient Electron Emitter Cold Cathode.
Patent,
Bernard Smith. Filed 16 Dec 77, patented 17 Apr 79, 3p AD-D006 352/9, PAT-APPL-861 147 Supersedes PAT-APPL-861 147-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An efficient electron emitter cold cathode is formed by first placing an N-type monocrystalline substrate of about 100 to about 500 microns in thickness in a furnace. The furnace is heated to about 850 C. to about 900 C. and an N-type layer of about 10 to 15 microns of SnO2 is deposited onto the top surface of the substrate using a suitable carrier gas. Then, a P-type layer of about 10 microns of SnO2 is deposited on the N-type layer. The furnace is then cooled at a rate of about 10 C. per minute to about 600 C. form the emitter. The furnace is then cooled to room temperature and the emitter removed from the furnace. The emitter is subjected to etching and polishing to obtain a P-type layer of about 2 to 4 microns, and a nonreactive metal contact is then deposited on the P-type layer. The emitter is then completed by bonding a metal contact to the base of the N-type monocrystalline substrate. (Author)

SAND-79-0120C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Electrode Slotting Process for Thin PLZT Wafers.
J. O. Harris, Jr., and V. Luft. 1979, 4p CONF-790670-4
Contract EY-76-C-04-0789
IEEE international symposium on application of ferroelectric, Minneapolis, MN, USA, 13 Jun 1979.

A new electroding technique entitled the electrode slotting process (ESP) has been developed for electroding 0.38-mm thick PLZT wafers for bonded lens assemblies in the USAF EEU-2/P Thermal/Flash Protective Goggle. The electrodes are formed by first cutting a mirror-image pattern of shallow interdigital slots on both sides of the PLZT wafer followed by an electroless plating of these slots and the wafer edge. Experimental results of operating voltage and closed-state optical density with respect to variations in slot depth and electrode geometry are also discussed. (ERA citation 04:050435)

9B. Computers

AD-A073 837/7 PC **A02**/MF **A01**
Military Academy West Point NY Dept of Earth Space and Graphic Sciences
Interactive Graphic Techniques For Conceptual Engineering Design.
Final rept.,
Glenn A. Porter. 20 Apr 79, 10p Rept no. USMA-ESGS-03
Presented at the 79 DECUS Conference, New Orleans, LA. 17-20 Apr 79.

Conceptual design is the initial and most creative phase of an engineering design project. The effective use of interactive computer graphics to enhance this design phase is dependent upon a highly developed interaction between the designer and the computer. This paper presents an analysis of the environment of conceptual design and proposes techniques for the creation of a successful man-machine interface which fosters the use of interactive computer graphics. (Author)

AD-A073 854/2 PC **A12**/MF **A01**
Honeywell Systems and Research Center Minneapolis Mn
Rationale for the Design of the ADA Programming Language. Volume 14. Number 6. Part B,
Jean D. Ichbiah, Jean-Claude Heliard, Olivier Roubine, John G. P. Barnes, and Bernd Krieg-Brueckner. Jun 79, 267p
Contract MDA903-77-C-0331

This document, the Rationale for the design of the Green programming language, and the companion Reference Manual, are the two defining documents for the Green language. They serve different purposes. The Reference Manual contains a complete and concise definition of the language. Following Wirth we believe in the virtue of having a rather short reference manual. This has the advantage of providing the information in a form that can easily be consulted, read and reread several times, as the basis for developing a good familarity with the language.

AD-A073 879/9 PC **A03**/MF **A01**
Army War Coll Carlisle Barracks PA
A Review of Army High Level Programming Languages and Documentation for ADP Software.
Study project,
James G. McKnight. 26 May 79, 49p

This paper reviews state of the art for high level programming languages and traces their development from first generation computers to the present day. A review and comparison of industry and Army standards for program documentation is made and differences discussed. Based upon field interviews, findings concerning command unique documentation are presented. Conclusions indicate that more powerful and cost effectve high level languages are available for use and that documentation for command unique software is not adequate. Recommendations are made for securing a system language, establishing a central review and approval authority for software documentation, and for various follow up studies. (Author)

AD-A073 904/5 PC **A03**/MF **A01**
Naval Surface Weapons Center Dahlgren Lab VA
TRICOMP6000 User's Guide.
Final rept.,
W. Caruthers, H. Huber, and J. Zaloudek. Mar 79, 33p Rept no. NSWC/TR-3938
See also AD-B028 790L.

TRICOMP6000 is a compiler for the TRIDENT Higher Level Language (THLL) that runs on, and produces code for, the CDC 6700. This document describes the differences between TRICOMP6000 and TRICOMP which is the standard compiler that translates THLL programs into code for the TRIDENT Digital Control Computer (TDCC). (Author)

AD-A073 923/5 PC **A05**/MF **A01**
Naval Postgraduate School Monterey CA
Distributed, Secure Design for a Multi-Microprocessor Operating System.
Master's thesis,
James Steven O'Connell, and Larry Don Richardson. Jun 79, 90p

This thesis applies the state of the art techniques for methodical design of secure operating systems to a distributed, multi-microprocessor environment. Explicit process structure and utilization of virtual environments are the fundamental concepts that form a basis for the design presented. The primary design techniques utilized in the design are segmentation, distributed operating system, security kernel, multiprocessing, 'cache' memory strategy and multiprogramming. The resulting design is for a family of distributed operating systems that can provide the power of yesterdays large computer in a microprocessor environment. Security, configuration independence, and a loop free structure are the primary characteristics of the design. The design, although hardware independent, was formulated with the Zilog Z8000 or similar microprocessor in mind. (Author)

AD-A073 927/6 PC **A06**/MF **A01**
Naval Postgraduate School Monterey CA
The Design and Implementation of an Inexpensive Microprocessor Development System for the Z-80 Microprocessor.
Master's thesis,
Douglas Floyd Corteville. Jun 79, 102p

The Radio Shack home computer system, TPS-80, configured with Level II Basic ROM's, 16K of RAM, its expansion interface, a single disk drive, and a line printer interface to the TELETYPE model 40 line printer is being used as a microprocessor development aid for the Z-80 microprocessor. Basic language programs are resident on the mini-disk and are used to load, to store, to dump, and to execute assembled assembly language programs. (Author)

AD-A073 956/5 PC **A03**/MF **A01**
Maryland Univ College Park Computer Science Center
A Comparison of some Simple Methods for Extracting Texture Primitives and Their Effectiveness in Texture Discrimination.
Interim rept.,
Shyuan Wang, Flavio R. D. Velasco, and Azriel Rosenfeld. Apr 79, 33p TR-759, AFOSR-TR-79-0966
Contract AFOSR-77-3271

Three simple methods of extracting texture primitives are compared. It appears that the simplest of these, thresholding at a fixed percentile, yields primitives that are quite effective in texture discrimination. (Author)

AD-A073 958/1 PC **A09**/MF **A01**
Massachusetts Inst of Tech Cambridge Lab for Computer Science
Laboratory for Computer Science Progress Report 15.
Annual summary rept. Jul 77-Jun 78,
M. L. Dertouzos. 10 Jul 79, 198p Rept no. LCS-PR-15
Contract N00014-75-C-0661

No abstract available.

AD-A073 982/1 MF **A01**
Advisory Group for Aerospace Research and Development Neuilly-sur-Seine (France)
Experimental Data Base for Computer Program Assessment,
Advisory rept.,
May 79, 612p Rept no. AGARD-AR-138
Availability: Microfiche copies only.

The economical advantages of applying transonic flow technology to aircraft design has created a large number of computational methods to predict and analyse transonic flows. The proof of validity and the refinement of such methods depend primarily on experimental results. Consequently errors inherent to data generated by any individual test facility may enter the computer codes thus restricting their applicability. To aid in the development and refinement of computational methods and to improve their applicability and compatibility an experimental data base was established, presenting selected test results and detailed geometric descriptions of representative airfoil, wing, wing-body and body-alone configurations. In addition, the basic limitations of the available data as well as suggestions for future tests designed to reduce these limitations are discussed in detail. (Author)

AD-A073 997/9 PC **A05**/MF **A01**
Maryland Univ College Park Computer Science Center
The FLEX System: User and Caretaker's Manual.
Technical rept.,
Stephen A. Sutton. Jun 79, 79p Rept no. CSC-TR-765
Grant AFOSR-77-3181A

The FLEX design system is a design language and its processor that form a tool for use in computer software design activities. This report presents a detailed definition of the FLEX language, directions for using the processor, and guidelines for installing, maintaining, and modifying the processor software. (Author)

AD-A074 019/1 PC **A04**/MF **A01**
Technology Service Corp Santa Monica CA
Computer Image Generation Texture Study.
Final rept.,

Tony Stenger, William Dungan, and Richard Reynolds. Aug 79, 73p AFHRL-TR-79-2
Contract F33615-77-C-0063

This development project resulted from the need to enhance visual flight simulators (based on computer image generation (CIG) techniques) with textured surfaces. Pilots viewing homogeneous surfaces experience an inadequate perception of motion above these surfaces as well as an ambiguity in the orientation of the surface. Therefore, it was felt that by using textured surfaces within the scene, both depth and motion cues would be made available. This report describes the approaches and techniques used to develop texture material and introduce it into a complex CIG scene. The approach is to create texture tile arrays of trees and grass from digitized photographs of natural texture. These arrays are then replicated over the surface in the fashion of tiles. Preprocessing techniques are described which eliminate the periodic effect due to the tile boundary and macropatterns within the tile itself. Level-of-detail texture tile arrays are created that match the resolution of the texture to the appropriate observer-scene viewing geometry. The level-of-detail arrays and other descriptive parameters are merged into the existing CIG software to produce textured images. Scenes depicting a landing sequence, a divebomb, and a low-altitude flight were then generated. These images show the effect of the varying levels of detail, fields of viewing geometries, and scene deriving distance and motion cues from the additional information contained in the textured images. (Author)

AD-A074 053/0 PC **A18**/MF **A01**
International Computing Co Bethesda MD
VTS Processing Display Subsystem Design.
Final rept. Apr 78-Jan 79,
C. C. Henson, F. T. Mickey, R. S. Graham, and B. A. McIntosh. Jan 79, 409p USCG-D-54-79, CGR/DC-13/79
Contract DOT-CG-81-78-1833

A distributed function, multiple bus coupled minicomputer system architecture will be used for the Vessel Traffic Services (VTS) Processing/Display Subsystem. Four critical issues are examined including: Reliability; Programming Language Selection; Interprocessor Bus Design; and Multicomputer Operating System Design. System availability requirements can be met with partial redundancy with software controlled reconfiguration and recovery based on both hardware and software error and failure detection. PASCAL is the best programming language available for VTS. A relatively low cost interprocessor bus capable of transmitting at 1.5 megabits per second can be built using off-the-shelf LSI components. The VTS operating system will feature explicit message and answer communications between processes for interprocess communication and synchronization. Error detection and reporting and system reconfiguration and recovery will be controlled by the operating system. The top level of the software design is structured as a group of cooperating sequential processes which use the operating system facility for interprocess communication and synchronization, providing flexibility in assigning processes to processors. Hardware configurations are developed for three possible combinations of functional and traffic handling capabilities. Hardware requirements are included for processors, buses, discs, tapes, graphics units, CRTs, printers, and keyboards. (Author)

AD-A074 075/3 PC **A02**/MF **A01**
Stanford Univ CA Dept of Computer Science
Induction over Large Data Bases.
Technical rept.,
J. R. Quinlan. May 79, 21p Rept nos. STAN-CS-79-739, HPP-79-14
Contract MDA903-77-C-0322

Techniques for discovering rules by induction from large collections of instances are developed. These are based on an iterative scheme for dividing the instances into two sets, only one of which needs to be randomly accessible. These techniques have made it possible to discover complex rules from data bases containing many thousand of instances. Results of several experiments using them are reported. (Author)

AD-A074 077/9 PC **A04**/MF **A01**
Stanford Univ CA Dept of Computer Science
A Structural Model for Database Systems.
Technical rept.,
Gio Wiederhold, and Ramez El-Masri. Feb 79, 59p Rept no. STAN-CS-79-722
Contract MDA903-77-C-0322

This report presents a model to be used for database design. Because our motivation extends to providing guidance for the structured implementation of a database, we call out model the Structural Model. We derive the design using criteria of correctness, relevance, and performance from semantic and operational specifications obtained from multiple sources. These sources typically correspond to prospective users or user groups of the database. The integration of such specifications is a central issue in the development of an integrated structural database model. The structural model is used for the design of the logical structures that represent a real-world situation. However, it is not meant to represent all possible real-world semantics, but a subset of the semantics which are important in database modelling.

AD-A074 078/7 PC **A06**/MF **A01**
Stanford Univ CA Dept of Computer Science
Search. A Section of the Handbook of Artificial Intelligence.
Technical rept.,
Anne Gardner. Jun 79, 113p Rept nos. STAN-CS-79-742, HPP-79-12
Contract MDA903-77-C-0322, ARPA Order-3423
Sponsored in part by Contract PHS-RR-00785-06.

In the Handbook we intend to cover the breadth and depth of AI, presenting general overviews of the scientific issues, as well as detailed discussions of particular techniques and important AI systems. Throughout we have tried to keep in mind the reader who is not a specialist in AI. As the cost of computation continues to fall, new areas of application of computers become potentially viable. For many of these areas, there do not exist mathematical 'cores' to structure calculational use of the computer. Such areas will inevitably be served by symbolic models and symbolic inference techniques. Yet those who understand symbolic computation have been speaking largely to themselves for twenty years. We feel that it is urgent for AI to 'go public' in the manner intended by the Handbook. Several other writers have recognized a need for more widespread knowledge of AI and have attempted to help fill the vacuum. Lay reviews, in particular Margaret Boden's Artificial Intelligence and Natural Man, have tried to explain what is important and interesting about AI, and how research in AI progresses through our programs. In addition, there are a few textbooks that attempt to present a more detailed view of selected areas of AI, for the serious student of computer science. But no textbook can hope to describe all of the sub-areas, present brief explanations of the important ideas and techniques, and review the 40 or 50 most important AI systems.

AD-A074 176/9 Not available NTIS
Rochester Univ NY Inst of Optics
Comparison of Coherent and Incoherent Optical Spectrum Analysis Techniques in Image Evaluation,
Scott A. Armstrong, and Brian J. Thompson. 29 Sep 77, 8p ARO-14101.2-GS
Grant DAAG29-77-G-0014
Presented at the SPIE Seminar on Data Extraction and Classification from Film, 23-24 Aug 77, San Diego, CA.
Availability: Pub. in Optical Engineering, v17 n3 p272-279 May-Jun 78 (No copies furnished by DDC).

No abstract available.

AD-A074 205/6 PC **A07**/MF **A01**
Ford Aerospace and Communications Corp Palo Alto CA
Preliminary Design of a Network Virtual Data Base System.
Final technical rept.
Aug 79, 150p RADC-TR-79-102
Contract F30602-77-C-0158

Development of the Network Virtual Data Base System (NVDBS) and the Adaptive User Interface (AUI) address several needs of DOD intelligence systems. The NVDBS could provide a bridge between different data base management systems (DMBSs)) on different host computers (nodes) linked through a network, without being required to know how to access each DBMS directly. The network level description of the information and its logical structures would be interactively available to the casual user. The informed user could then 'navigate' through the Network Data Model (NDM). Further, the analyst could discover and link correlated data, for the NVDBS will support 'virtual linkages' between records physically located on different DBMSs of the NVDBS network. For a DBMS to be accessible on the NVDBS network, it must be on a node of the network, and must be linked to the NVDBS through an interface tailored to the idiosyncrasies of the particular DBMS and node. The NVDBS will behave as an ordinary user of each DBMS on the network. The NVDBS also will support the creation of 'virtual linkages' between record instances physically located on different hosts. This report overviews the preliminary design study. (Author)

AD-A074 213/0 PC **A02**/MF **A01**
Alabama Univ in Huntsville School of Science and Engineering
An Assessment of Software Quality Assurance.
Final rept. 8 Jun 78-7 Jul 79,
Pei Hsia, and Frederick E. Petry. Jul 79, 23p
Contract DASG60-78-C-0068

This final report describes three tasks which can strengthen the Ballistic Missile Defense Systems Command overall research objectives in software systems development. The three tasks are: Preprocessor for Verifiable PASCAL (V-PASCAL). Evaluation of Software Quality Laboratory (SQLAB) Tools and Techniques. Testing Research - A New Approach. V-PASCAL is a language designed by GRC to extend PASCAL to permit experimentaion with new language constructs which will aid in the development of BMD software. These capabilities can be implemented with a preprocessor which accepts an input source code written in V-PASCAL, and generates standard PASCAL for compilation, or which extracts for verification purposes descriptive information about the source text. The feasibility of a preprocessor for V-PASCAL has been investigated, and a conclusion is that a revised design of the GRC produced V-PASCAL preprocessor will suffice for the present.

AD-A074 224/7 PC **A02**/MF **A01**
Stanford Univ CA Stanford Electronics Labs
Design and Verification of Reliable Software.
Rept. no. 2 (Annual), 1 Jan-31 Dec 78,
Susan S. Owicki. Jul 79, 11p AFOSR-TR-79-0978
Contract F49620-77-C-0045

This research project is concerned with methods for developing provably correct system programs. Two complementary approaches have been pursued. The first is the development of basic tools for describing and verifying concurrent programs; the aim is to find ways of managing the complexity which arises from concurrent interactions between system components. Specification and proof methods for invariant properties of modular programs have been developed. They allow independent verification of each module and provide a sufficient basis for reasoning about a wide class of concurrent systems. Tools for stating and verifying other types of requirements, e.g. that a message is eventually delivered, are in an earlier stage. Techniques have been designed that use temporal logic, a logical system that allows statements about future events.

AD-A074 321/1 MF **A01**
GTE Sylvania Inc Needham Heights MA Electronic Systems Group-Eastern Div
HF Programmable Modem.
Final technical rept. 15 Apr-15 Oct 74.
15 Oct 74, 196p
Contract N00014-74-C-0299
Availability: Microfiche copies only.

This is the final report of a seven-month program beginning April 15, 1974 and ending approximately October 15, 1974 to design and fabricate two programmable signal processors with the necessary software to provide for real time operation of specific High Frequency Modem configuration. These configurations include: (a) Convential time-differ-

ential phase shift keyed modulation (TDPSK). (b) DEFT mode, using frequency differential phase shift keyed modulation (FDPSK). (c) CODEM mode, combined TDPSK with coding for error control and the use of soft decision decoding.

AD-A074 332/8 PC **A02**/MF **A01**
Columbia Univ Dobbs Ferry NY Hudson Labs
WIZ as a Program Language,
Melvin Klerer. 1962, 6p Rept no. INFORMAL DOCUMENTATION-29
Contract Nonr-266(84)
Pub. in Proceedings of the GE-225 Computer Users Group, p45-48 1963. Presented at Spring Membership Meeting, Held at Phoenix, AZ., on March 11-13, 1963.

No abstract available.

FIPS-PUB-64 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC.
Guidelines for Documentation of Computer Programs and Automated Data Systems for the Initiation Phase. Category: Software. Subcategory: Documentation.
Federal information processing standards.
1 Aug 79, 50p
Three ring vinyl FIPS binder also available, North American Continent price $6.25; all others write for quote.

These guidelines provide a basis for determining the content and extent of documentation for the initiation phase of the software life cycle. Content guidelines are given for the following document types: Project Request Document, Feasibility Study Document, and Cost/Benefit Analysis Document. The guidelines are intended to be a basic reference and a check-list for general use throughout the Federal Government to plan and evaluate documentation practices.

N79-31153/6 PC **A04**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
Equation Modifying Program, L219 (EQMOD). Volume 2: Supplemental System Design and Maintenance Document.
Topical Report, May 1975 - May 1977.
M. Y. Hirayama, R. E. Clemmons, and R. D. Miller. Sep 79, 65p NASA-CR-2856, D6-44465-V-2
Contract NAS1-13918

A digital computer program, L219 (EQMOD), available for execution on the CDC 6600 is described. The program modifies matrices according to card input instructions and prepares magnetic files of matrices suitable for use in the linear systems analysis program (QR) and the random harmonic analysis program L221 (TEV156). The particular field of application of the program is the modification of the theoretical equations of motion and load equations generated in DYLOFLEX by the equation of motion program (L217) and the load equation program (L218), respectively.

N79-31263/3 PC **A09**/MF **A01**
Engins Matra, Velizy (France).
Study on Evolution of Command and Data Management on Spacelab (CDMS).
Final Report.
P. Jourdan, J. P. Ruffie, M. Turin, J. Valero, and P. Pitard. Nov 78, 183p TN-MA-158, ESA-CR(P)-1227
Contract ESA-3520/78-NL-JS

The evolution of command and data management systems (CDMS) on Spacelab was studied not to redesign the CDMS but mainly to improve it by specific modifications which fall into five improvement categories. Results are, by category: (1) an extension of the memory to 128 words to increase operational flexibility; (2) the implementation of a magnetic bubble memory of a disk to augment CDMS versatility; (3) the rejection of a space hardening of CDMS equipment scheme due to difficulties with component changes and mechanical redesign; (4) a significant power reduction with existing CDMS equipment; and (5) a mission duration extension up to 30 days involving only minor CDMS modification. The CDMS impact on ground support systems is also reviewed.

N79-31533/9 PC **A05**/MF **A01**
Douglas Aircraft Co., Inc., Long Beach, CA.
A New Approach to the Solution of Large, Full Matrix Equations: A Two-Dimensional Potential Flow Feasibility Study.
Final Report.
R. M. James, and R. W. Clark. Sep 79, 83p NASA-CR-3173
Contract NAS1-14892

An approach to the solution of matrix problems resulting from integral equations of mathematical physics is presented. Based on the inherent smoothness in such equations, the problem is reformulated using a set of orthogonal basis vectors, leading to an equivalent coefficient problem which can be of lower order without significantly impairing the accuracy of the solution. This approach was evaluated using a two-dimensional Neumann problem describing the inviscid, incompressible flow over an airfoil. Two different kinds of mode functions were investigated, namely eigenfunction series and Fourier series. The method using Fourier series was found preferable. It uses all of the coefficients from a Fast Fourier Transform algorithm in an approximate method which exploits the known structure of the transformed coefficient matrix and very promising results for the flow over a realistic airfoil are obtained. On the basis of the results presented here, an order of magnitude reduction in computer time can be expected for such problems as compared with the time for a direct matrix solution.

N79-31590/9 PC **A08**/MF **A01**
British Aerospace Dynamics Group, Bristol (England). Electronics and Space Systems.
Study of Optical Processing of Image Data on Board Spacecraft.
Final Report.
M. B. Brown, D. Thomas, and A. Levenston. Apr 79, 156p ESS/SS-936, ESA-CR(P)-1215
Contract ESTEC-3455/77-NL-PP(SC)

The possibility of performing optical processing of image data on board spacecraft was investigated in order to assess the effects of reducing the data transmission rate. A survey of optical processing techniques and potential applications is included. The optical processing arrangements are discussed and three systems are treated in detail. Further work is recommended for the spectral classifier and the model correlation systems, since analysis can be performed in real time, and a detailed development program is proposed.

N79-31954/7 PC **A04**/MF **A01**
Hughes Aircraft Co., Culver City, CA. Technology Support Div.
Electrical Evaluation of RCA MWS5001D Random Access Memory, Volume 1.
Final Report.
A. Klute. Jun 79, 51p NASA-CR-162261, FR-79-76-915-V-1
Contract JPL-954789
Seri-5. Subm-Sponsored by NASA Prepared for JPL.

Electrical characterization and qualification tests were performed on the RCA MWS5001D, 1024 by 1-bit, CMOS, random access memory. Characterization tests were performed on five devices. The tests included functional tests, AC parametric worst case pattern selection test, determination of worst-case transition for setup and hold times and a series of schmoo plots. The qualification tests were performed on 32 devices and included a 2000 hour burn in with electrical tests performed at 0 hours and after 168, 1000, and 2000 hours of burn in. The tests performed included functional tests and AC and DC parametric tests. All of the tests in the characterization phase, with the exception of the worst-case transition test, were performed at ambient temperatures of 25, -55 and 125 C. The worst-case transition test was performed at 25 C. The preburn in electrical tests were performed at 25, -55, and 125 C. All burn in endpoint tests were performed at 25, -40, -55, 85, and 125 C.

N79-31955/4 PC **A09**/MF **A01**
Hughes Aircraft Co., Culver City, CA. Technology Support Div.
Electrical Evaluation of RCA MWS5001d Random Access Memory, Volume 2, Appendix A.
Final Report.
A. Klute. Jun 79, 178p NASA-CR-162262, FR-79-76-915-V-2-APP-A
Contract JPL-954789
Seri-5. Subm-Sponsored by NASA Prepared for JPL.

The electrical characterization and qualification test results are presented for the RCA MWS5001D random access memory. The tests included functional tests, AC and DC parametric tests, AC parametric worst-case pattern selection test, determination of worst-case transition for setup and hold times, and a series of schmoo plots. The address access time, address readout time, the data hold time, and the data setup time are some of the results surveyed.

N79-31956/2 PC **A23**/MF **A01**
Hughes Aircraft Co., Culver City, CA. Technology Support Div.
Electrical Evaluation of RCA MWS5001D Random Access Memory, Volume 3, Appendix B.
Final Report.
A. Klute. Jun 79, 548p NASA-CR-162263, FR-79-76-915-V-3
Contract JPL-954789
Seri-5. Subm-Sponsored by NASA Prepared for JPL.

The electrical characterization and qualification test results are presented for the RCA MWS5001D random access memory. The tests included functional tests, AC and DC parametric tests, AC parametric worst-case pattern selection test, determination of worst-case transition for setup and hold times, and a series of schmoo plots. The test values for the output voltage, average input current, the supply current and the leakage current are presented.

N79-31957/0 PC **A17**/MF **A01**
Hughes Aircraft Co., Culver City, CA. Technology Support Div.
Electrical Evaluation of RCA MWS5001D Random Access Memory, Volume 4, Appendix C.
Final Report.
A. Klute. Jun 79, 384p NASA-CR-162264, FR-79-76-915-V-4
Contract JPL-954789
Seri-5. Subm-Sponsored by NASA Prepared for JPL.

The electrical characterization and qualification test results are presented for the RCA MWS5001D random access memory. The tests included functional tests, AC and DC parametric tests, AC parametric worst-case pattern selection test, determination of worst-case transition for setup and hold times, and a series of schmoo plots. Statistical analysis data is supplied along with write pulse width, read cycle time, write cycle time, and chip enable time data.

N79-31958/8 PC **A07**/MF **A01**
Hughes Aircraft Co., Culver City, CA. Technology Support Div.
Electrical Evaluation of RCA MWS5001D Random Access Memory, Volume 5, Appendix D.
Final Report.
A. Klute. Jun 79, 129p NASA-CR-162265, FR-79-76-915-V-5
Contract JPL-954789
Seri-5. Subm-Sponsored by NASA Prepared for JPL.

The electrical characterization and qualification test results are presented for the RCA MWS 5001D random access memory. The tests included functional tests, AC and DC parametric tests, AC parametric worst-case pattern selection test, determination of worst-case transition for setup and hold times, and a series of schmoo plots. Average input high current, worst case input high current, output low current, and data setup time are some of the results presented.

N79-31959/6 PC **A08**/MF **A01**
Hughes Aircraft Co., Culver City, CA. Technology Support Div.
Electrical Characterization of the RCA CDP1822SD Random Access Memory, Volume 1, Appendix A.
Final Report.

A. Klute. Jun 79, 164p NASA-CR-162258, FR-79-76-867-V-1-APP-A
Contract JPL-954789
Seri-3. Subm-Sponsored by NASA Prepared for JPL.

Electrical characteristization tests were performed on 35 RCA CDP1822SD, 256-by-4-bit, CMOS, random access memories. The tests included three functional tests, AC and DC parametric tests, a series of schmoo plots, rise/fall time screening, and a data retention test. All tests were performed on an automated IC test system with temperatures controlled by a thermal airstream unit. All the functional tests, the data retention test, and the AC and DC parametric tests were performed at ambient temperatures of 25 C, -20 C, -55 C, 85 C, and 125 C. The schmoo plots were performed at ambient temperatures of 25 C, -55 C, and 125 C. The data retention test was performed at 25 C. Five devices failed one or more functional tests and four of these devices failed to meet the expected limits of a number of AC parametric tests. Some of the schmoo plots indicated a small degree of interaction between parameters.

N79-31960/4 PC **A19**/MF **A01**
Hughes Aircraft Co., Culver City, CA. Technology Support Div.
Electrical Characterization of the RCA CPD1822SD Random Access Memory, Volume 2,.
Final Report.
A. Klute. Jun 79, 432p NASA-CR-162260, FR-79-76-867-V-2
Contract JPL-954789
Seri-3. Subm-Sponsored by NASA Prepared for JPL.

Raw data obtained from functional tests, data retention tests, and AC and DC parametric tests are presented along with schmoo plots. Rise/fall time screening results are included.

N79-31961/2 PC **A03**/MF **A01**
Hughes Aircraft Co., Culver City, CA. Technology Support Div.
Electrical Characterization of Hughes Hcmp 1852D and RCA CDP1852D 8-Bit, CMOS, I/O Ports.
Final Report.
R. L. Stokes. Jun 79, 48p NASA-CR-162259, FR-79-76-869
Contract JPL-954789
Seri-3. Subm-Sponsored by NASA Prepared for JPL.

Twenty-five Hughes HCMP 1852D and 25 RCA CDP1852D 8-bit, CMOS, I/O port microcircuits underwent electrical characterization tests. All electrical measurements were performed on a Tektronix S-3260 Test System. Before electrical testing, the devices were subjected to a 168-hour burn-in at 125 C with the inputs biased at 10V. Four of the Hughes parts became inoperable during testing. They exhibited functional failures and out-of-range parametric measurements after a few runs of the test program.

N79-32025/5 PC **A04**/MF **A01**
Applications Mathematiques et Logiciel (AML) SARL, Neuilly-sur-Seine (France).
Numerical Study of Conservative Filters. Volume 1: Algorithms and Experiments.
J. Boissieres, and S. Larcher. Dec 78, 69p ESA-CR(P)-1208-V-1
Contract ESOC-3365/78-D-JS(SC)
Seri-2.

The results of a numerical study of conservative filters are presented in a two volume report. In this volume the algorithms used and the experiments conducted are described. A variety of conservative prediction and updating filtering algorithms, which were obtained in a previous theoretical study, were implemented and tested. After a unified reformulation of the algorithms for the different concepts of conservativity, a general numerical method was devised to obtain conservative terms by optimization techniques. Moreover, procedures to select in an optimum way arbitrary parameters in algorithms were designed. The methods were implemented and tested in typical orbit determination problems. Tests were made separately for the prediction and for the updating step, since they are of a totally different nature. Results obtained are reported and commented on. Besides the verification of conserveness, they point out satisfactory results, but at the same time reveal some critical items in the applications. The software used is also described in detail.

N79-32026/3 PC **A06**/MF **A01**
Applications Mathematiques et Logiciel (AML) SARL, Neuilly-sur-Seine (France).
Numerical Study of Conservative Filters. Volume 2: Software Description.
J. Boissieres, and S. Larcher. Dec 78, 170p ESA-CR(P)-1208-V-2
Contract ESOC-3365/78-D-JS(SC)
Seri-2.

The results of a numerical study of conservative filters are presented in a two volume report. In this volume a complete description of the software is given. The conservative filter software is composed of the filter package itself and a special program of plotting. The filter package is divided into four steps with an overlay structure. For the overly structure, a user's guide chapter is included. A seperate plotting program uses two files generated by the filter to produce a picture file which can be used by Tektronix of Stromberg-Carlson devices. References to volume 1 details concerning the implemented equations are given.

ORNL/TM-6871 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Influence Function and Its Application to Data Validation.
M. R. Chernick. Aug 79, 21p
Contract W-7405-ENG-26

Hampel's influence function has been used by Devlin, Gnanadesikan, and Kettenring to detect bivariate observations which have unusual influence on estimates of correlation. In the validation of energy data systems such observations may sometimes be considered to be outliers. The identification of such outliers may be valuable for the detection of errors in a data base. When data are used in regression equations, those observations which have the greatest effect on the multiple correlation coefficient or the regression coefficients are of interest. The contours of constant influence are derived for the multiple correlation coefficient in the case of regressing two variables on a third. In some problems the analytic form of the influence function may be difficult to derive. In such cases the empiric estimator of the influence function, as proposed by Mallows, may be useful for detecting outliers. For FPC form 4 power plant data, the correlation between generation and consumption is a parameter of interest to users of the data. Estimates of the contours of constant influence were determined and used to detect outliers with respect to bivariate correlation. (ERA citation 04:050920)

PATENT-4 163 985 Not available NTIS
Department of the Air Force Washington DC
Nonvolatile Punch through Memory Cell with Buried N+ Region in Channel.
Patent,
Fritz L. Schuermeyer, and Charles R. Young.
Filed 30 Sep 77, patented 7 Aug 79, 6p AD-D006 317/2, PAT-APPL-838 437
Supersedes PAT-APPL-838 437-77, AD-D004 489.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A nonvolatile memory cell is disclosed that has a buried n+ layer from which charge (electrons) is injected into the insulator of n-channel MNOS (Metal Nitride Oxide Semiconductor) type devices. (Author)

PB80-101702 PC **A05**/MF **A01**
Federal Compiler Testing Center, Washington, DC.
Sperry Univac EXEC-8 Operating System.
Validation summary rept.
29 Oct 79, 92p CCVS74-VSR430

This Validation Summary Report (VSR) for the Sperry Univac 1100 Series Cobol Compiler Version 4R2A (EXEC-8 Version 36R10C) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the HIGH level of FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language; and a detailed listing of discrepancies together with the tests which were failed.

PB80-102361 PC **A04**/MF **A01**
Federal Compiler Testing Center, Washington, DC.
NCR Corporation, IMOS COBOL Version 04.03.04.
Validation summary rept.
16 Oct 79, 68p CCVS74-VSR460

This Validation Summary Report (VSR) for the NCR I-8200 Series COBOL Compiler Version 04.03.04 (IMOS III Version 4) provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated at the LOW INTERMEDIATE level of FIPS PUB 21-1. The VSR is made up of several sections showing the discrepancies found. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal levels of the language, and a detailed listing of discrepancies together with the tests which were failed.

PB80-104698 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. Inst. for Computer Sciences and Technology.
Computer Science and Technology: A Key Notarization System for Computer Networks.
Final rept.,
Miles E. Smid. Oct 79, 39p NBS/SP-500-54
Library of Congress catalog card no. 79-600160.

A cryptographic key notarization system is proposed for computer networks to protect personal (nonshared) files, to communicate securely both on and off-line with local and remote users, to protect against key substitution, to authenticate system users, to authenticate data, and to provide a digital signature capability using a nonpublic key encryption algorithm. The system is implemented by the addition of key notarization facilities which give users the capability of exercising a set of commands for key management as well as for data encryption functions. Key notarization facilities perform notarization which, upon encryption, seals a key or password with the identities of the transmitter and intended receiver.

UCRL-82431 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Protocol for Buffer Space Negotiation.
D. Nessett. 26 Jun 79, 24p CONF-790834-1
Contract W-7405-ENG-48
Berkeley workshop on distributed data management and computer networks, Berkeley, CA, USA, 28 Aug 1979.

There are at least two ways to manage the buffer memory of a communications node. On etechnique veiws the buffer as a single resource that is to be reserved and released as a unit for a particular communication transaction. A more common approach treats the node's buffer space as a collection of resources (e.g., bytes, words, packet slots) capable of being allocated among multiple concurrent conversations. To achieve buffer space multiplexing, some sort of negotiation for buffer space must take place between source and sink nodes before a transaction can commence. Results are presented which indicate that, for an application involving a CSMA broadcast network, buffer space multiplexing offers better performance than buffer reservation. To achieve this improvement, a simple protocol is presented that features flow-control information traveling both from source to sink as well as from sink to source. It is argued that this bidirectionality allows the sink to allocate buffer space among its active communication paths more effectively. 13 figures. (ERA citation 04:050923)

9C. Electrical and Electronic Engineering

AD-A074 083/7 PC **A02**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Advanced Electronic Technology.
Quarterly technical summary rept. 1 Feb-30 Apr 79,
Alan J. McLaughlin, and Alan L. McWhorter. 15 May 79, 19p ESD-TR-79-74
Contract F19628-78-C-0002

This Quarterly Technical Summary covers the period 1 February through 30 April 1979. It consolidates the reports of Division 2 (Data Systems) and Division 8 (Solid State) on the Advanced Electronic Technology Program. (Author)

AD-A074 118/1 Not available NTIS
Illinois Univ at Urbana-Champaign Coordinated Science Lab
A Detection-Estimation Approach to State Estimation in Switching Environments,
J. K. Tugnait, and A. H. Haddad. 1979, 6p ARO-13480.7-MX
Contract DAAB07-72-C-0259, Grant DAAG29-76-G-0154
Availability: Pub. in Proceedings of Asilomar Conference on Circuits, Systems and Computers, 6-8 Nov 78, Pacific Grove, CA, p260-264. (No copies furnished by DDC).

No abstract available.

AD-A074 265/0 PC **A18**/MF **A01**
Air Force Weapons Lab Kirtland AFB NM
Electromagnetic Pulse Interaction Notes-EMP 3-39.
Final rept.,
Carl E. Baum. Jul 79, 415p AFWL-TR-79-402, AD-E200 363

This is a series of notes on electromagnetic pulse interaction. Subjects covered are: Electromagnetic Penetration Through a Circular Aperture in a Plane Screen Separating a Conducting Medium and Nonconducting Medium; Small Aperture on a Multiconductor Transmission Line Filled with Inhomogeneous Dielectrics; On the Electromagnetic Field Excitation of Unshielded Multiconductor Cables; A Coupling Model for a Pair of Skewed Transmission Lines; On the Analysis of General Multiconductor Transmission-Line Networks; Field Excitation of Multiconductor Transmission Lines; Diffraction through a Circular Aperture in a Screen Separating Two Different Media; and The Receiving Properties of the Small Annular Slot Antenna.

AD-A074 282/5 Not available NTIS
California Univ Berkeley Electronics Research Lab
Preferrential Chemical Etching of Blazed Gratings in (110)-Oriented GaAs,
Mohammad Kazem Shams, Dan Botez, and Shyh Wang. 2 Jun 78, 3p ARO-11833.33
Grants DAAG29-74-G-0070, NSF-ENG76-08292
Availability: Pub. in Optics Letters, v4 n3 p96-98 Mar 79. (No copies furnished by DDC).

No abstract available.

AD-A074 344/3 Not available NTIS
Carnegie-Mellon Univ Pittsburgh PA Dept of Mathematics
Almost Definite Operators and Electro-Mechanical Systems,
R. J. Duffin, and T. D. Morley. 13 Dec 76, 10p ARO-13966.5-M
Grant DAAG29-77-G-0024
Availability: Pub. in SIAM Jnl. of Applied Mathematics, v35 n1 p21-30 Jul 78 (No copies furnished by DDC).

No abstract available.

COO-4206-8 PC **A02**/MF **A01**
Purdue Univ., Lafayette, IN. School of Electrical Engineering.
Security Assessment of Power Systems Including Energy Storage. Progress Report, January 1, 1979--March 31, 1979.
D. P. Carroll, and D. M. Triezenberg. Apr 79, 4p
Contract EC-77-S-02-4206

A parameter estimation algorithm has been found which, theoretically, is capable of on-line operation. It has been implemented and the implementation has been confirmed by performance on simple first and second order systems. However, convergence has not been obtained for higher order systems. (ERA citation 04:049857)

JPL-PUB-79-35(V.1) PC **A03**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Proceedings of the Distribution Automation and Control Working Group. Volume I: Executive Summary.
Mar 79, 33p CONF-7811130-P1(Sum.)
Distribution automation and control working group, Baltimore, MD, USA, 20 Nov 1978.

Results are presented of the Working Group Meeting for Distribution Automation and Control (DAC) on the Electric Power System held on November 20--22, 1978 at Baltimore, Maryland. Its purpose was to bring together some members of the electric utility community so that they might reach a common understanding on: key issues and uncertainties to be resolved; the existing state of the art; and specific requirements for further RD and D in the area of DAC. The meeting consisted of several presentations and working sessions. The statements and recommendations formulated by the group on various topics are presented. (ERA citation 04:048542)

N79-31437/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Analytical Model of an Annular Momentum Control Device (AMCD) Laboratory Test Model Magnetic Bearing Actuator.
N. J. Groom. Aug 79, 21p NASA-TM-80099

An analytical model of an Annular Momentum Control Device (AMCD) laboratory test model magnetic bearing actuator with permanent magnet fluxbiasing is presented. An AMCD consists of a spinning annular rim which is suspended by a noncontacting linear electromagnetic spin motor. The actuator is treated as a lumped-parameter electromechanical system in the development of the model.

9D. Information Theory

AD-A073 947/4 Not available NTIS
Illinois Univ at Urbana-Champaign Coordinated Science Lab
Suboptimal Sequential Estimation-Detection Scheme for Poisson Driven Linear Systems,
S. Au, and A. H. Haddad. May 78, 19p ARO-13480.4-MX
Contracts DAAB07-72-C-0259, DAAG29-76-G-0154
Availability: Pub. in Information Sciences, v16 p95-113 1978. (No copies furnished by DDC).

No abstract available.

AD-A074 298/1 PC **A06**/MF **A01**
Connecticut Univ Storrs Dept of Electrical Engineering and Computer Science
AFOSR Workshop in Communication Theory and Applications.
Final rept.,
P. Papantoni-Kazakos. 20 Aug 79, 120p AFOSR-TR-79-0955
Grant AFOSR-78-3715
Pub. in AFOSR Workshop in Communication Theory and Applications, held at Provincetown, MA. 17-20 Sep 78.

A workshop in Communication theory and applications was held. There were 6 papers on Stochastic processes related to communication problems. Six papers were presented on the subject of source coding. Five papers were presented in topics in Statistical pattern recognition. Seven papers were presented in Communication theory. Five papers were presented on Computer networks. Six papers were presented on spread-spectrum multiple-Access communications. Finally five papers were presented on adaptive equalizers.

9E. Subsystems

AD-A073 885/6 PC **A02**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
A SAW/CCD Accumulating Correlator.
Journal article,
Daniel L. Smythe, Ernest Stern, and Richard W. Ralston. 29 Jan 79, 4p JA-4931, ESD-TR-79-177
Contract F19628-78-C-0002
Pub. in Applied Physics Letters, v34 n10 p620-622, 15 May 79.

No abstract available.

AD-A073 940/9 Not available NTIS
Kentucky Univ Lexington Dept of Electrical Engineering
Simulation Study of Electronically Scannable Antennas and Tunable Filters Integrated in a Quasi-Planar Dielectric Waveguide,
Tatsuo Itoh, and Albert S. Hebert. 5 Jun 79, 5p ARO-15465.6-EL
Contract DAAG29-77-G-0220
Availability: Pub. in IEEE Transactions on Microwave Theory and Techniques, vMTT-26 n12 p987-991 Dec 78. (No copies furnished by DDC).

No abstract available.

AD-A073 962/3 PC **A11**/MF **A01**
Naval Postgraduate School Monterey CA
An In-Depth Study of the Sensitivity of Wave Digital Filters,
Masoud Sanaie-Fard. Jun 79, 240p

A detailed analytical and experimental study of the sensitivity of wave digital filters has been conducted. The results indicate that the wave digital filter tends to achieve the same low sensitivity characteristic as the analogue circuit from which it was derived. Other results indicate relatively higher sensitivity to terminating resistance values compared with internal element values, lower sensitivity for algorithms derived from simple rather than multiple elements, and higher sensitivity at the critical frequencies. Finally the rms error due to the quantization in the number of bits in the multiplier coefficients has been measured at approximately 3 db per bit for the many examples tested. (Author)

AD-A073 963/1 PC **A08**/MF **A01**
Naval Postgraduate School Monterey CA
Geometric Design Technique for Two-Dimensional Analog and Digital Filters.
Master's thesis,
Coskun Zumrutkaya. Jun 79, 154p

A technique for the use of semi-infinite planes to approximate the log magnitude versus log frequency characteristics of two-dimensional filters is presented (Extended Bode approach). This technique is applied to quarter plane filters and works well for separable transfer functions. Other non-separable canonic (basic) transfer functions are also studied in terms of their planar approximation. The general technique is shown to be useful for the insight it provides as well as being a simple approach to design. The double bilinear z-transform is studied for use with the two-dimensional analog transfer functions to convert them to the digital domain. (Author)

AD-A074 013/4 Not available NTIS
California Univ Berkeley Dept of Electrical Engineering and Computer Sciences
High-Performance NMOS Operational Amplifier,
Daniel Senderowicz, David A. Hodges, and Paul R. Gray. 1 Oct 77, 7p ARO-13962.1-EL
Grant DAAG29-76-G-0244
Availability: Pub. in IEEE Jnl. of Solid-State Circuits, vSC013 n6 p760-766 Dec 78.

No abstract available.

AD-A074 038/1 PC **A02**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Some Techniques for Evaluating the Bandwidth Characteristics of Adaptive Nulling Systems..
Journal article,
Joseph T. Mayhan. 15 Jun 78, 13p JA-4818, ESD-TR-79-170
Contract F19628-78-C-0002
Pub. in IEEE Transactions on Antennas and Propagation, vAP27 n3 p363-373 May 79.

No abstract available.

AD-A074 056/3 PC **A02**/MF **A01**
Research Advisory Inst Inc South Laguna CA
Superconducting Microwave Pulse Amplifier.
Final rept.,
D. L. Birx, G. J. Dick, W. A. Little, J. E. Mercereau, and D. J. Scalapino. Jul 79, 24p Rept no. RAI-111
Contract N00014-75-C-1115

This report summarizes the preliminary research and development of a new and novel technique for very high power microwave pulse amplification. The technique is based on the principle of time compression and is most efficient when utilized in conjunction with superconducting (cryogenic) components. However, it has also been shown to be applicable as a purely ambiant temperature device. Very high power microwave pulses appear to be feasible with this technique. (Author)

AD-A074 127/2 PC **A04**/MF **A01**
Spire Corp Bedford MA
Research on Low Temperature, Directed Energy Processing of Very Large Scale Integrated Structures.
Semiannual technical rept. 1 Jan-30 Jun 79,
Anton Greenwald. Jul 79, 60p Rept no. SAR-79-10065-01
Contract MDA903-79-C-0212, ARPA Order-3713

The goal of this research program is to demonstrate processing techniques which can eliminate the need for high temperature thermal cycling of silicon wafers in fabricating very large scale integrated (VLSI) devices. Maintaining low temperatures for all processing reduces plastic deformation, diffusion and autodoping problems which would limit the application of submicron geometry design rules. Pulsed electron beam surface heating of the top micron of material is being investigated for annealing of ion-implantation damage and epitaxial regrowth of low temperature chemical-vapor-deposition (CVD) polycrystalline silicon films. Initial research has demonstrated the epitaxial regrowth of 0.3 micron films deposited at 800 degrees C. Annealing of ion-implantation damage typical of buried layer applications has also been demonstrated. Effective uniformity of processing has been improved to + or - 4 percent in one (electron beam) pulse covering the surface of a 3-inch-diameter wafer. Research planned in the next 6 months will stress lower deposition temperatures and pulsed nonmelting techniques for annealing implantation damage. The program is about 2 months ahead of schedule. (Author)

AD-A074 165/2 PC **A02**/MF **A01**
National Security Agency/Central Security Service Fort George G Meade MD
Circuit Analysis of a High Q Superconducting HF Notch Filter.
Technical memo.,
John J. Hudak. 11 Jul 77, 17p

This technical memorandum presents an analysis of the high frequency (HF) notch filter circuit used by Cutler Hammer Airborne Instruments Lab (AIL). This analysis leads to a set of equations which can be used to determine the values of the circuit components needed to achieve a specific notch depth and bandwidth in the filter's frequency response. These design equations are then interpreted geometrically in terms of the location of the poles and zeros in the S-plane. Several plots of the filter's frequency response as a function of critical circuit parameters are also presented. (Author)

AD-A074 251/0 Not available NTIS
Houston Univ TX Dept of Electrical Engineering
Impedance of a Circular-Disc Printed-Circuit Antenna,
Stuart A. Long, Liang C. Shen, Mark D. Walton, and Martin R. Allerding. 6 Sep 78, 3p ARO-15407.2-EL
Grant DAAG29-78-G-0198
Availability: Pub. in Electronics Letters, v14 n21 p684-686, 12 Oct 78. (No copies furnished by DDC).

No abstract available.

AD-A074 254/4 Not available NTIS
Houston Univ TX Dept of Electrical Engineering
Theory of the Circular-Disc Printed-Circuit Antenna,
S. A. Long, L. C. Shen, and P. B. Morel. 24 Apr 78, 4p ARO-15407.1-EL
Grant DAAG29-78-G-0198
Availability: Proceedings of the IEEE, v125 n10 p925-928 Oct 78 Paper no. 8189E. (No copies furnished by DDC).

No abstract available.

AD-A074 266/8 PC **A10**/MF **A01**
Physics International Co San Leandro CA
Development of a High-Voltage Linear Actuator Amplifier System.
Final rept.,
D. Smart. Jul 79, 208p PIFR-1052, AFWL-TR-78-123, AD-E200 364
Contract F29601-77-C-0047

A lightweight, compact, 61-channel linear switching amplifier system has been developed for aircraft use. Each channel accepts input in the + or - 10 V range and outputs + or - 1500 V into a capacitive load of 0.05 microfarads. The design employs a system of incremental resonant charging of the load, controlled by a system clock. Internal losses are minimized to hold size and weight to a minimum. The amplifiers as designed are flat in frequency response dc to 400 Hz without slew rate limitation. Linearity is better than 1% full scale. The system is intended to drive piezoelectric actuators of an adaptive optics mirror system. An overall design of the system with computer modeling was completed and a two-channel breadboard was constructed, debugged, and tested. The tests showed that system design requirements were met with only minor deficiencies in maximum voltage and slew rate, correctable with nominal development efforts.

AD-A074 302/1 Not available NTIS
California Univ Berkeley Electronics Research Lab
Planar Sandwich Antennas for Submillimeter Applications,
Tien-Lai Hwang, D. B. Rutledge, and S. E. Schwarz. 14 Aug 78, 3p ARO-13770.4-EL
Grants DAAG29-76-G-0284, NSF-ENG74-03428
Availability: Pub. in Applied Physics Letters, v34 n1 p9-11, 1 Jan 79. (No copies furnished by DDC).

No abstract available.

AD-A074 304/7 Not available NTIS
California Univ Berkeley Dept of Electrical Engineering and Computer Sciences
Design Techniques for MOS Switched Capacitor Ladder Filters,
Gordon M. Jacobs, David J. Allstot, Robert W. Brodersen, and Paul R. Gray. 24 Apr 78, 8p ARO-13962.3-EL
Grant DAAG29-76-G-0244
Availability: IEEE Transactions on Circuits and Systems, vCAS-25 n12 p1014-1021 Dec 78. (No copies furnished by DDC).

No abstract available.

AD-A074 306/2 Not available NTIS
California Univ Berkeley
Evaluation of Radiation Fields Using Statistical Methods of Integration,
Chris W. Alexion, Kenneth K. Mei, and T. K. Liu. 1 Feb 77, 6p ARO-14270.2-EL
Grant DAAG29-77-G-0021
Availability: Pub. in IEEE Transactions on Antennas and Propagation, vAP-26 n2 p288-293 Mar 78. (No copies furnished by DDC).

No abstract available.

N79-31185/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
UHF Coplanar-Slot Antenna for Aircraft-to-Satellite Data Communications.
R. W. Myhre. 1979, 21p NASA-TM-79239, E-146
Conf-Presented at the Printed Circuit Antenna Technol. Workshop, Las Cruces, N. Mex., 17-19 Oct. 1979; Sponsored by New Mexico State Univ. And the Army Res. Office Physical Sci. Lab.

A lightweight low drag coplanar slot antenna was developed for use on commercial jet aircraft that will provide upper hemisphere coverage in the UHF band at frequencies of 402 and 468 MHz is described. The antenna is designed to transmit meteorological data from wide body jet aircraft to ground users via synchronous meteorological data relay satellites. The low profile antenna (23.5 cm wide by 38.1 cm long slot by 1.9 cm high) is a conformal antenna utilizing the coplanar approach with the advantages of broad frequency bandwidth and improved electrical integrity over wide range of temperature. The antenna is circular polarized, has anon axis gain of near +2.5 dB, and a HPBW greater than 90 deg. Areas discussed include antenna design, radiation characteristics, flight testing, and system performance.

N79-31453/0 PC **A12**/MF **A01**
TICRA ApS, Copenhagen (Denmark).
Study of Techniques for the Design of High Gain Antennas with Contoured Beams.
Final Report.
P. Balling, R. Joergensen, and K. Pontoppidan. Dec 78, 256p S-89-02, ESA-CR(P)-1178
Contract ESTEC-3371/77-NL-AK(SC)

A contoured-beam antenna concept is considered involving the use of a large reflector system in combination with a multiple-feed array. High-gain antennas with contoured beams are envisaged as being used in future satellite systems, e.g. for direct TV broadcast and telecommunication. Different synthesis methods are compared prior to the selection of one method. The implementation of the selected method into general synthesis software as well as the application of the developed software to practical synthesis examples are described.

N79-31454/8 PC **A06**/MF **A01**
Institute of Microwave Technology, Stockholm (Sweden).
A Study of a Low Noise Millimeter Wave Mixer.
Final Report.
F. Sellberg. 31 Dec 78, 104p ESA-CR(P)-1191
Contract ESTEC-3144/77-NL-AK(SC)

A breadboard model of a broadband 30/11 GHz mixer with low conversion loss was designed, measured, and delivered. Schottky-barrier mixer diodes of different makes were characterized and one type was selected for the mixer. Filter circuits for the mixer ports were specified and designed. The mixer section was optimized with regard to diode loading at the mixer frequencies. Special attention was paid to image enhancement in proper phase and to trapping of local oscillator harmonics. Due mainly to the inherent high Q of the packaged mixer diodes available, the instantaneous bandwidth was restricted to 2 GHz with mechanical tuning over the full 3.5 GHz originally specified. The conversion loss in this bandwidth can be kept below 5.6 dB with a maximum input of 3.1:1 over the whole range of operating temperature and IF load mismatch. A low local oscillator power (2 to 3 mW) was chosen to minimize the gain variation. At delivery the mixer was tuned to a bandwidth of 1.4 GHz with conversion loss below 4.6 dB and input VSWR below 2:1 (room temperature and load VSWR = 1.0:1).

N79-31514/9 PC **A04**/MF **A01**
Laboratoires d'Electronique et de Physique Appliquee, Limeil-Brevannes (France).
Étude de la Faisabilite de l'Opacite de l'Ecran et de la Courbure d'Une Galette de Microcanaux de 40MM de Diametre en Vue d'Une Application pour UN Tube Intensificateur a Comptage de Photons (Feasibility Study Concerning Screen Opacity as well as the Curve of the Microchannels in a 40MM Channel Multiplier Relative to Applications in a Photomultiplier Tube).
Final Report.
J. C. Rosier, V. Duchenois, and E. Desvaux. Dec 78, 54p SME/78.648/659I, ESA-CR(P)-1195
Contract ESTEC-3307/NL-AK(SC)
Language in French.

Relative to the improvement of the performance characteristics of the photon detector sub-assembly and the faint object camera to be used on the NASA space telescope, a photomultiplier tube was studied. Results include the improvement of the imaging screen by increasing the opacity of the aluminum membrane which covers the luminophor of the screen. A channel multiplier with curved microchannels was also developed in order to optimize the gain in electron multiplication afforded by increased screen opacity. The deposition processes used in fabricating the screen are discussed for

the various schemes investigated. Tests and results for both the screen and channel multiplier are detailed.

N79-31517/2 PC **A07**/MF **A01**
Fabrica Italiana Apparecchi Radio S.p.A., Milan (Italy).
Evaluation of EPSILAM-10 MIC Substrate Material.
P. L. Faja, C. Scotti, and M. Ronsisvalle. Dec 78, 135p FIAR-SA0347, ESA-CR(P)-1203
Contract ESTEC-3153/77

The suitability of the EPSILAM-10 material as substrate for microwave microstrip circuits, taking into account the anisotropy in the dielectric constant, is studied. As a theoretical tool, a computer program for the calculation of line impedances was used. To evaluate the application of the material 50 ohm lines, coupled lines directional couplers, hybrid type power dividers, and class-C transistor power amplifiers were designed, manufactured and tested. The main conclusion is that the material is suitable for use in microwave microstrip applications, where high tolerances are not mandatory (e.g. for transistor matching networks or couplers to be used in signal samplers).

N79-31518/0 PC **A04**/MF **A01**
Thomson-CSF, Velizy (France). Div. Tubes Electroniques.
An Acoustic Wave Oscillator Functioning in the 1.5 Ghz Range Oscillateur a Ondes Acoustiques Fonctionnant au Voisinage de 1.5 Ghz.
Final Report.
Y. Charlet. Feb 79, 71p TR-2056-T, ESA-CR(P)-1204
Contract ESTEC-3149/77-NL-AK(SC)
Language in French.

Two surface acoustic wave oscillators, each consisting of a free transistor oscillator phase locked with a reflective array of acoustic delay lines, were built and studied in order to develop a local oscillator suitable for use in a model of a satellite repeater. The performance characteristics of the as-built device were also compared with existing oscillator, notably a quartz oscillator, a cavity stabilized oscillator, and a phased oscillator. Of the breadboard phase locked oscillator, one has an output power of 100 mW with a short term stability of eight nano/sec, an AM noise level -60dB, and an acceptable FM noise spectra. The second has a short term stability of two nano/sec for an output power of 50 mW, the other characteristics being analogous to the first.

N79-31586/7 PC **A11**/MF **A01**
Ferranti Ltd., Bracknell (England). Digital Systems Div.
Onboard Signal Processing, Technology and Systems. Volume 1: Signal Processing Operations.
D. J. Bonfield, J. R. Moon, J. R. E. Thomas, and D. W. Cruse. Dec 77, 227p REPT-3066-V-1, ESA-CR(P)-1206-V-1
Contract ESA-2896/76-HP
Seri-4.

Work carried out with respect to typical algorithms to be implemented in the area of special purpose onboard spacecraft payload signal processing is presented. A comprehensive range of signal processing operations are examined from convolution through to analog to digital conversion, including correlation, the Fourier transform, linear discrete filters, windowing, number theoretic transforms, and statistical calculations. A number of other transforms are also considered, namely the chirp-Z, prime, Walsh, Haar, discrete cosine, slant, and Karhunen-Loeve. This latter transform, of importance in image data compression, is only discussed briefly since its implementation is examined in considerable detail in volume 3. For each topic a brief theoretical introduction is followed by a discussion of various methods of hardware realization, with references made to known implementations using advanced technological devices giving high speed of operation and low power consumption. Also included in this volume is a discussion of spectrum analysis including zooming and a comprehensive bibliography.

N79-31587/5 PC **A20**/MF **A01**
Ferranti Ltd., Bracknell (England). Digital Systems Div.
Onboard Signal Processing, Technology and Systems. Volume 2: Signal Processing Technologies.
K. M. Harvey, M. J. Abraham, J. H. Harding, M. H. Wright, and D. W. Cruse. Mar 78, 471p REPT-3134-V-2, ESA-CR(P)-1206-V-2
Contract ESA-2896/76-HP
Seri-4.

Work carried out with respect to descriptions of fundamentals of advances technologies and the applicability of these advances technologies to be processing operations outlined in volume 1 is presented. Both analog and digital technologies were considered and include, for example, charge coupled devices (analog and digital), surface acoustic waves (SAW), integrated injection logic, complementary MOS (CMOS), CMOS/SOS (silicon-on-sapphire), and many others. For each advanced technology considered, a brief historical introduction is given, followed by the principle of operation and construction, its applications, and future trends. The most relevant of these technologies are then discussed with regard to the applicability of the technologies to signal processing operations giving details of achievable performance and, where possible, direct comparisons of the technologies, particularly in respect to speed of operation and power consumption. Included in this volume as appendices are manufacturer's visit reports, selected component data sheets, definitions of technological terms, and a comprehensive bibliography.

N79-31588/3 PC **A04**/MF **A01**
Ferranti Ltd., Bracknell (England). Digital Systems Div.
Onboard Signal Processing, Technology and Systems. Volume 3: Signal Processing Applications.
D. J. Bonfield, J. R. E. Thomas, and D. W. Cruse. Mar 78, 66p REPT-3135-V-3, ESA-CR(P)-1206-V-3
Contract ESA-2896/76-HP

Three separate reports, each describing a real-time processing system and discussing the applicability of advanced technoloyies to its implementation are presented. The first report is concerned with synthetic aperture radar (SAR) processing. Following a section dealing with the characteristics of the SAR signal, three sampled data system architectures suitable for performing the processing in real-time are introduced. Extensions to these architectures, required to allow range migration correction and subaperture processing to be performed, are then considered. Finally processor implementations are discussed based on a tentative specification. The second and third reports, describe the hardware implementation of the Karhunen-Loeve transform and a histogram clustering technique for image data compression, respectively. The main aim is to produce an implementation giving the lowest power consumption using advanced analog and digital technologies. The most promising approach seems to be a digital solution using custom SOS CMOS whereby an order of magnitude reduction, compared with present-day devices, can be achieved.

N79-31589/1 PC **A20**/MF **A01**
Ferranti Ltd., Bracknell (England). Digital Systems Div.
Onboard Signal Processing, Technology and Systems. Volume 4: Signal Processing Devices: Visit Reports, Data Sheets and Manufacturers Addresses.
K. M. Harvey, M. J. Abraham, M. H. Wright, and D. W. Cruse. Mar 78, 462p REPT-3190-V-4, ESA-CR(P)-1206-V-4
Contract ESA-2896/76-HP
Seri-4.

Reports on visits made to manufacturers and research centers actively engaged in advanced technology development, such as metal oxide semiconductors, SOS semiconductors, and surface acoustic wave devices, are presented as the fourth part of a study on onboard spacecraft payload signal processing.

PATENT-4 101 896 Not available NTIS
Department of the Army Washington DC
Camouflaged Dual-Slot Antenna.
Patent,
Kurt Ikrath, Paul Sexton, Peter Pingitore, and William Kennebeck. Filed 14 Apr 77, patented 18 Jul 78, 9p AD-D006 321/4, PAT-APPL-787 412
Supersedes PAT-APPL-787 412-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A low profile camouflaged antenna is described for military vehicles and the like. The antenna comprises an elongated, typically rectangular, sheet of metal curved to conform to the curvature of the vehicle. Insulated spacers, for example of plastic or fiberglass, maintain a fixed spacing between the metal plate and the vehicle, thus forming two elongated slots which, when suitably energized, act as a dual-slot antenna. (Author)

PATENT-4 137 819 Not available NTIS
Department of the Army Washington DC
Launch Tube Antenna.
Patent,
Jester M. Loomis, III. Filed 28 Nov 77, patented 6 Feb 79, 4p AD-D006 340/4, PAT-APPL-855 149
Supersedes PAT-APPL-855 149-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent concerns an antenna mounted within a missile launch tube which acts as a communication link between the launcher and the missile. The launch tube is made of fiberglass with a metallic conductor embedded therein to provide radio frequency radiation. The antenna is in the form of a helical conductor and provides radiation in the tube's axial direction.

PATENT-4 142 159 Not available NTIS
Department of Energy, Washington, DC.
Missing Pulse Detector for a Variable Frequency Source.
Patent,
C. B. Ingram, and J. H. Lawhorn. Filed 7 Nov 77, patented 27 Feb 79, 4p PAT-APPL-849 200
Supersedes PAT-APPL-849 200-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A missing pulse detector is provided which has the capability of monitoring a varying frequency pulse source to detect the loss of a single pulse or total loss of signal from the source. A frequency-to-current converter is used to program the output pulse width of a variable period retriggerable one-shot to maintain a pulse width slightly longer than one-half the present monitored pulse period. The retriggerable one-shot is triggered at twice the input pulse rate by employing a frequency doubler circuit connected between the one-shot input and the variable frequency source being monitored. The one-shot remains in the triggered or unstable state under normal conditions even though the source period is varying. A loss of an input pulse or single period of a fluctuating signal input will cause the one-shot to revert to its stable state, changing the output signal level to indicate a missing pulse or signal. (ERA citation 04:050458)

PATENT-4 149 169 Not available NTIS
Department of the Army Washington DC
Configuration of Two Antennae with Signal Isolation.
Patent,
John W. Weber. Filed 20 Jan 78, patented 10 Apr 79, 9p AD-D006 350/3, PAT-APPL-871 045
Supersedes PAT-APPL-871 045-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The configuration consists of two antennae on the same mast. The upper antenna is a ground plane capable of two frequency bands of operation. The lower antenna comprises a sleeve and radial elements. The upper antenna consists of four radials 36 in. long and an upper element. The two bands

of operation covered by the upper antenna are 80 MHz and 150 MHz. Band selection is accomplished by selection of the correct upper mast element. This element is removable. A 34in. long element is used for 80 MHz operation and a 14 in. long element for 150 MHz operation. This antenna is nondirectional and is used for transmitting. The lower antenna consists of four radials 22 in. long and an upper and lower sleeve. The radials are insulated from the mast and connected to the center conductor of the coax. The upper sleeve is a portion of this antenna and also isolates the antenna from the mast. The only use of the lower sleeve is to provide isolation of the antenna from the mast and coaxial cable. This antenna is nondirectional and used for receiving at 140 MHz. The upper and lower antenna are isolated by 20 dB. (Author)

PATENT-4 151 476
Not available NTIS
Department of the Army Washington DC
Magnetic Bubble Traveling Wave Amplifier.
Patent,
Louis J. Jasper, Jr. Filed 15 Aug 78, patented 24 Apr 79, 8p AD-D006 362/8, PAT-APPL-933 702
Supersedes PAT-APPL-933 702-78, AD-D005 454.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A device is disclosed for amplifying electromagnetic waves propagating along a meander line slow wave structure by means of magnetic cylindrical domains or bubbles which are propagating at substantially the same velocity as the RF wave in an adjacent platelet of orthoferrite, having associated with it a propagation arrangement of the conventional type which is adapted to move the domains from one end of the platelet to the other. As the magnetic bubbles are magnetic dipoles that produce magnetic surface charges, a portion of their energy is transferred to the propagating RF wave, resulting in amplification of the RF wave. (Author)

PATENT-4 152 706
Not available NTIS
Department of the Army Washington DC
Log Periodic Zig Zag Monopole Antenna.
Patent,
Normand Barbano, and Samuel C. Kuo. Filed 27 Dec 77, patented 1 May 79, 6p AD-D006 365/1, PAT-APPL-864 993
Supersedes PAT-APPL-864 993-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The basic log periodic zig zag antenna is made of one continuous conductor wherein vertical wires function as radiators when they are in resonance. Horizontal wires of the antenna are the phasing stubs, which provide the proper phase shift for the radiating elements. Efficiency of the antenna is enhanced by effectively shortening the path between adjacent elements in the active region with a single conductor. Additionally, a vertical conductor between the shortened path conductor and the respective radiating elements reduces the resonance Q of the vertical radiators and functions as a mechanical support for the radiators. (Author)

PATENT-4 155 016
Not available NTIS
Department of the Army Washington DC
Sharpening High Power Pulses.
Patent,
Gerhart K. Gaule, Sol Schneider, Stephen Levy, and Paul R. Laplante. Filed 8 Nov 77, patented 15 May 79, 4p AD-D006 374/3, PAT-APPL-849 565
Supersedes PAT-APPL-849 565-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A metal oxide threshold switch (MOTS), e.g., NbOx, x preferably fractionally less than 2, series connected, is used to sharpen the pulse rise to about one or less nanosecond, with a peak up to several kilovolts, and up to 100 amperes or more. (Author)

PATENT-4 155 017
Not available NTIS
Department of the Army Washington DC
Sharpening High Power Pulses.
Patent,
Gerhart K. Gaule, Sol Schneider, and Stephen Levy. Filed 9 Nov 77, patented 15 May 79, 7p AD-D006 375/0, PAT-APPL-849 820
Supersedes PAT-APPL-849 820-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A metal oxide threshold switch (MOTS), e.g., NbOx, x preferably fractionally less than 2, series connected, is used to sharpen the pulse rise to about one nanosecond, with a peak of thousands of volts, and up to 100 amperes or more. A trigger pulse is used to further sharpen the pulse and reduce jitter. (Author)

10. ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

ANL/EES-TM-48 PC **A04**/MF **A01**
Argonne National Lab., IL.
Trends and Issues in Energy Supply and Demand in the Midwest.
J. D. Cavallo. Apr 78, 71p
Contract W-31-109-ENG-38

This report presents and analyzes the major trends and issues in the supply and demand patterns of the North Central Census division. It focuses on statistics of pre-1976 energy flows and estimates of 1976 resources and consumption patterns. Regional trends in supply and demand are characterized for the entire North Central area. Individual states are also viewed separately to observe deviations from regional patterns. Information on North and South Dakota is included because, at the time this report was prepared, these states were part of ANL's regional responsibility. The area consists of Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, Nebraska, and Kansas. (ERA citation 04:046804)

BNL-26217 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Heat Pump Impact Upon Solar Collector Design and Cost.
J. W. Andrews. 1979, 5p CONF-790541-22
Contract EY-76-C-02-0016
International Solar Energy Society meeting, Atlanta, GA, USA, 28 May 1979.

Required collector area in series solar assisted heat pump systems is determined for three cities as a function of collector performance characteristics and compared with systems in which the solar-derived heat is used directly. Effect on system performance of improvements in heat pump performance is discussed. A cost vs yield analysis of several existing collectors is performed. (ERA citation 04:048334)

BNL-50927 PC **A04**/MF **A01**
Brookhaven National Lab., Upton, NY.
Locational Analysis for the Aluminum Industry.
W. Isard, and L. Parcels. Dec 77, 53p
Contract EY-76-C-02-0016

A locational analysis for the aluminum industry suggests that its locational pattern is probably even more clear-cut than that of the steel industry. Because the smelting of alumina into aluminum requires a very large amount of electric power, aluminum has become an industry highly oriented to cheap-power locations. A quick analysis, taking into account present technological and economic conditions, reveals that the potential advantages of the minimum-transport-cost location for an aluminum plant are clearly outweighed by the large power cost savings accruing from locating the plant at a cheap-power location. This holds true even with a fairly small differential in power rates between the two locations. (ERA citation 04:050280)

BNL-50999 PC **A04**/MF **A01**
National Center for Analysis of Energy Systems, Upton, NY.
Modeling Market Penetration with Emphasis on the DFI Energy-Economy System.
R. Condap, and A. S. Kydes. Apr 79, 60p
Contract EY-76-C-02-0016

This paper provides a general overview and review of market penetration, the gradual substitution over time of a new commodity for one or more existing commodities in satisfying basic consumption or production needs. The paper then describes, in detail, the market penetration representations of the Decision Focus, Inc. (DFI) modeling system in terms of: (i) its relation to existing representations in the literature; (ii) issues of stability and sensitivity; (iii) issues of parameter measurability; and (iv) its relation to probabilistic interpretations of consumer behavior. (ERA citation 04:050152)

CONF-7805161- PC **A11**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Proceedings of the First Seattle Workshop on Incentives Used to Stimulate Energy Production.
B. W. Cone. Feb 79, 248p
Contract EY-76-C-06-1830
Seattle workshop on incentives used to stimulate energy production, Seattle, WA, USA, 31 May 1978.

The introductory paper of this workshop was an overview of report PNL-2410, an Analysis of Federal Incentives Used to Stimulate Energy Production; the next four papers critiqued the report. The next 28 presentations were from individuals or various workshop discussion groups on either incentives for solar energy development or for energy source development in general. A separate abstract was prepared for each. (ERA citation 04:050199)

CONF-790727-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Systematic Method for Rapid Resource Assessment.
A. H. Voelker. 1979, 15p
Contract W-7405-ENG-26
IIASA-RSI conference on systems aspects of energy and mineral resources, Laxenburg, Austria, 9 Jul 1979.

A versatile method was developed to rate the energy- and mineral-resource potentials of areas in which land-management and resource-development decisions must be reached with a minimum expenditure of money and time. The method (1) surveys published and personal information on resources in the region being assessed, (2) selects the most appropriate information, (3) synthesizes the information into map overlays and tract descriptions, (4) rates the potential of tracts for particular resources, (5) rates the overall importance of each tract for resource development, and (6) documents the ratings and their significance. The method was applied to two separate but roughly similar geologic regions. Areas within these regions being considered for possible wilderness designation were rated for their resource potential, and the results were communicated to the appropriate land managers. A comparison of the ratings by this method with ratings produced by other groups demonstrates general agreement but shows this method to be more sensitive than other methods to individual area anomalies. (ERA citation 04:050163)

CONF-790729-1 PC **A02**/MF **A01**
Union Carbide Corp., Oak Ridge, TN. Computer Sciences Div.
Sampling Proportional to Random Size.
V. R. R. Uppuluri, and S. A. Patil. 1979, 13p
Contract W-7405-ENG-26
International conference on mathematical modeling, St Louis, MO, USA, 11 Jul 1979.

Let X sub 1 , X sub 2 ,...,X/sub N/ be N nonnegative i.i.d. random variables. Let Y sub 1 = X/sub alpha / with probability X/sub alpha /(X sub 1 + ... + X/sub N/), alpha = 1,2...N. This is referred to as the first realization when sampling with probability proportional to size. Next Y sub 1 is deleted from X sub 1 ,X sub 2 ,...,X/sub N/ and other observation, Y sub 2 , is made similarly. It is of interest to find the distributional properties of the sequence Y sub 1 ,Y sub 2 ,...,Y/sub n/ (n less than or equal to N). These properties are used by E.

Barouch and G.M. Kaufman in order to estimate recoverable oil resources. The distributional properties of (Y sub 1 ,Y sub 2 ,...Y/sub n/) are presented for the case when X/sub alpha / has a general distribution, and specialized for the case when X/sub alpha / has a gamma distribution. The distributional properties of Y/sub n/ are also obtained given the immediate past y/sub n-1/; these results supplement the distributional properties of Y/sub n/ given y sub 1 ,y sub 2 ,...,y/sub n-1/. (ERA citation 04:049475)

CONS-5058-T1 PC **A02**/MF **A01**
Air Products and Chemicals, Inc., Allentown, PA.
Demonstration of a Nitrogen Based Carburizing Atmosphere (Energy Consumption of the Endothermic Generator). First Quarterly Report, 1 October 1978--30 December 1978.
R. J. Peartree. Jan 79, 22p
Contract EM-78-C-01-5058

This first quarterly report details the energy consumption of an endothermic generator. Two different sized generators were studied and found to have basically the same energy usage characteristics. The energy consumption was found to be dependent on generator output, with less energy consumption per unit volume at higher outputs. (ERA citation 04:048854)

COO-2893-6 PC **A04**/MF **A01**
Illinois Univ. at Urbana-Champaign. Center for Advanced Computation.
Labor and Net Energy Effects of a National Ceiling Insulation Program. Final Report.
C. Ford. Sep 78, 56p
Contract EY-76-S-02-2893

Improving the thermal efficiency of homes has been widely publicized as an important energy saver. This study examines the energy and labor implications of retrofitting single-family detached homes with ceiling insulation. Calculations are made of the energy savings which would be realized if all ceilings which are now underinsulated were retrofitted to meet each of two sets of current recommendations. A maximum feasible implementation level of 70% is proposed, and the resulting effects on labor demands and energy use in the insulation industries and throughout the economy are then analyzed. A hybrid analysis is performed to determine the energy and labor requirements of the relatively new cellulose-insulation industry. (ERA citation 04:046878)

DOE/EIA-0176 PC **A07**/MF **A01**
Energy Information Administration, Washington, DC.
Buyer/Seller Codes.
J. Ryan, and M. Hirsh. Apr 79, 127p

The Buyer/Seller Codes in this publication are six digit code numbers assigned to buyers and sellers of natural gas for use in Federal Energy Regulatory Commission (FERC) data collection efforts. The publication is organized alphabetically by name. (ERA citation 04:049490)

DOE/EIA-0177 PC **A17**/MF **A01**
Energy Information Administration, Washington, DC.
Small Producer Certificate Dockets Sequenced by Docket Number.
J. Ryan, and M. Hirsh. Apr 79, 376p

This publication lists, in numerical sequence, all small producer certificate dockets assigned by the Federal Energy Regulatory Commission (FERC) through the filing date of the last listed docket. (ERA citation 04:049493)

DOE/EIA-0178 PC **A18**/MF **A01**
Energy Information Administration, Washington, DC.
Small Producer Certificate Holders and CO-Owners, Listed Alphabetically.
J. Ryan, and M. Hirsh. Apr 79, 401p

This publication lists all applicants and co-owners in small producer certificate applications filed with the Federal Energy Regulatory Commission (FERC) through February 5, 1979. (ERA citation 04:049494)

DOE/EIA-0182/2 PC **A99**/MF **A01**
Energy Information Administration, Washington, DC.
1985, 1990, and 1995 Midterm Energy Market Model Results under Three Scenarios of Fuel Use Act Regulations.
W. D. Montgomery, III. May 79, 624p

The Council on Wage and Price Stability (COWPS) requested an analysis of the incremental impacts of the Powerplant and Industrial Fuel Use Act regulations as a function of the stringency of the economic test under which exemptions are granted. To carry out this analysis, EIA is utilizing the Mid-Term Energy Market Model (MEMM) to generate projections of energy supply, demand, and price under the specified assumptions. Industrial fuel demand is modeled by using a separate fuel-choice model to determine the share of oil, gas, and coal; these shares are then imposed on the MEMM solution. For electric utilities, impacts are modeled by altering the capital costs in the MEMM submodel. The purpose of this report is to transmit, without endorsement, preliminary numerical results of some of the model runs. The appendix provides results of nine MEMM runs based on regulatory scenarios and other assumptions supplied by COWPS. The results were reviewed to determine that the specified assumptions were implemented properly. (ERA citation 04:048767)

DOE/EIA-0182/4 PC **A02**/MF **A01**
Energy Information Administration, Washington, DC.
Midterm Energy Forecasting System: Stand-Alone Boiler Model Results. Service Report SR/OA/79-04.
F. H. Murphy, and J. H. Zalkind. May 79, 18p

The Council on Wage and Price Stability requested an analysis of the incremental impacts of Fuel Use Act regulations as a function of the stringency of the economic test under which exemptions are granted. To carry out this analysis, EIA utilized both the stand-along Industrial Boiler Fuel Choice Model and a version of the same model integrated with the mid-term energy forecasting system to generate projections of industrial boiler fuel demand under the specified assumptions. The purpose of this report is to transmit, without endorsement, preliminary numerical results of some model runs used to generate the requested projections. The Appendix to the Report provides the results based on regulatory scenarios and other assumptions supplied by COWPS. EIA considered several cases. They fall into two main categories: the first uses the Btu equivalent price of distillate to evaluate the fuel cost of using natural gas in boilers; the second uses the Btu equivalent residual oil price instead. (ERA citation 04:048736)

DOE/EIA-0183/7 PC **A04**/MF **A01**
Energy Information Administration, Washington, DC.
Review and Application of MULTIREGION as a Regional Economic Impact and Projection Model. Technical Report TR/IA/79-26.
A. D. Sandoval. May 79, 54p

The report provides an overview of the MULTIREGION model and its use to determine the regional economic implications of three energy and economic projections developed for use in the EIA's 1977 Annual Report to Congress. The MULTIREGION projections are compared with similar projections undertaken using the Regional Earnings Impact System (REIS), developed and maintained by EIA. The strengths and weaknesses of the two modeling systems are reviewed. Examples of the MULTIREGION projection output are presented in an appendix. (ERA citation 04:050149)

DOE/EIA-0184/3 PC **A06**/MF **A01**
Energy Information Administration, Washington, DC.
Effects of Oil Regulation on Prices and Quantities: A Qualitative Analysis.
P. F. Dickens, III. May 79, 101p

Effects of federal oil regulations on the markets for crude oil and its refined products are examined. The directions in which prices and quantities are altered by these regulations are determined by a qualitative economic analysis. Comparisons are made between the price and output decisions of the present markets and those decisions in the absence of these regulations. The general conclusion is that the oil regulations as a whole lead to generally lower prices and higher utilization of crude oil and refined products. (ERA citation 04:048124)

DOE/EIA-0184/4 PC **A07**/MF **A01**
Energy Information Administration, Washington, DC.
Energy Supply and Demand in the Short Term: 1979 and 1980.
Jun 79, 128p

The report represents the short-term analysis contained in the EIA Annual Report to Congress, 1978. It provides overall energy supply and demand balances as well as a detailed discussion of the elements of end-use consumption of coal, natural gas, petroleum products, and electricity. In addition, it presents analyses of the operations of utilities and refineries, the domestic production of coal, natural gas, crude oil, and electricity and the supply and demand balances for each fuel. The first section deals with three topics: the analytical methodology; the sources of uncertainty; and, the major assumptions which underlie the three projection series to be presented. The overall energy balances are discussed in the next section. The following sections present the projections of the consumption and the supply of energy. The supply sections include projections of domestic production as well as supply and demand balances, synthetics and imports, and projections for the electric utility sector. The short-term energy projections are compared with those of the EIA Annual Report to Congress, 1977, and with those published by industry groups. (ERA citation 04:048762)

DOE/EIA-0184/6 PC **A02**/MF **A01**
Energy Information Administration, Washington, DC.
Estimate of the 1979 Cost of Oil Imports into the United States. Analysis Report.
Jul 79, 18p

This Analysis Report estimates the cost of imports into the 50 States, Puerto Rico and the Virgin Islands during the remainder of 1979 based on two different assumptions concerning U.S. demand and imports and world oil prices. The low demand estimate is based on low foreign supply and consequent high world oil prices, while the high demand is based upon high foreign supply and low prices. This analysis assumes that demand is not constrained by shortages of available imports of crude oil and may overestimate consumption and imports somewhat if actual shortages occur. The Census estimate of imports averaged 9.21 million barrels a day for the first quarter, at a free alongside ship cost of $11.58 billion. In the low demand projection series, using high world prices which dampen U.S. demand and imports of petroleum, total imports on a balance of payments basis would average 8.96 million barrels a day for the full year 1979 at a cost of $60.16 billion. In the high demand series, which incorporates a low world price, demand is higher and imports would average 9.91 million barrels a day. However, the annual cost would be less than in the low demand case, or $53.24 billion, with lower prices offsetting higher import volume. (ERA citation 04:048115)

DOE/EIA-0184/7 PC **A05**/MF **A01**
Energy Information Administration, Washington, DC.
Effect of Legislative and Regulatory Actions on Competition in Petroleum Markets. Analysis Report: AR/EI/79-29.
M. Taschdjian. Apr 79, 76p

This study evaluates the combined effects of major legal and regulatory actions on competition in the domestic oil production and refining sectors. The historical periods before and after the oil embargo of 1973 are examined to determine the impact of the total regulatory framework first, on the process of competition, and second, on major classes of competitors. It is concluded that the combination of laws and regulations which were established after the Arab oil embargo had little impact on eliminating competition in oil production and refining. Impediments to competition that existed in these industries prior to the embargo were largely unchanged under the post-embargo generation of regulations. (ERA citation 04:048116)

DOE/EIA-0184/8 PC **A03**/MF **A01**
Energy Information Administration, Washington, DC.
Demand for World Coal Through 1995. Analysis Report.
H. S. Weigel. May 79, 36p

The analysis is based on the results of several energy models of the Energy Information Administration (EIA). Results from the International Energy Evaluation System (IEES) constituted the most significant contribution. The U.S. forecasts were obtained from the Midterm Energy Market Model (MEMM) reports. The modeling framework within which the analysis was made is that used for the projections made for the 1978 EIA Annual Report to Congress (ARC). The assumed world oil price levels were estimated by EIA in a related study using the Oil Market Simulation (OMS) model. The principal results are as follows: The non-CPE World coal (including lignite) consumption is projected to steadily increase from 1400 million metric tons in 1976 to 2700 to 3200 in 1995. Steam coal trade is expected to increase significantly. An increasng proportion of coal fired electricity generation is also expected. The results depend on economic growth assumptions, world oil price assumptions, and calculated fuel switching, as well as an assumed increase in nuclear power. (ERA citation 04:048098)

DOE/ER-0029 PC **A23**/MF **A01**
Department of Energy, Washington, DC. Office of Field Operations Management.
DOE Research and Development and Field Facilities.
Jun 79, 546p

This report describes the roles of DOE's headquarters, field offices, major multiprogram laboratories, Energy Technology and Mining Operations Centers, and other government-owned, contractor-operated facilities which are located in all regions of the United States. It gives brief descriptions of resources, activities, and capabilities of each field facility (sections III through V). These represent a cumulative capital investment of $12 billion and involve a work force of approximately 12,000 government (field) employees and approximately 100,000 contractor employees. (ERA citation 04:048744)

DOE/ERA-6373 PC **A03**/MF **A01**
Resource Planning Associates, Inc., Cambridge, MA.
Rationale for Continued Exemption of Asphalt from Mandatory Petroleum Allocation Regulations.
Jul 79, 33p
Contract EB-78-C-01-6373

As a basis for analyzing the effects of an oil shortage on the asphalt industry, a worst-case shortage resulting from a year-long, 1979 crude oil embargo by OAPEC was hypothesized. It is concluded that during such a 20% oil shortage, refiners would in general produce and distribute asphalt according to the relative priorities of its users, and asphalt's relative priority to other petroleum products. (ERA citation 04:048125)

DOE/ET-0092 PC **A04**/MF **A01**
Department of Energy, Washington, DC. Div. of Solar Technology.
Urban-Rural Insolation Correlation Study.
Apr 79, 56p

The results of an analysis of simultaneous measurements of incident solar radiation from six locations in metropolitan St. Louis, MO, are described. The measurements were taken continuously from September 1975 through March 1977 with pyranometers with all-wave and 395-nm and 695-nm cutoff filters. The objective of the report is to document typical urban-rural variations of incident solar radiation. Atmospheric pollutants over the center of metropolitan St. Louis reduced incident all-wave solar irradiation by about 3%. Differences between urban and rural irradiation were about 1% greater than average during winter and 1% less than average in summer. At two suburban sites, the irradiation depletion averaged 1% and 2% for summer and winter seasons, respectively. Also, the ratios between stations for the complete experiment, under all conditions, were similar to those for cloudfree conditions. The comparisons were stratified according to wind direction and speed, visibility, time of day, and day of the week; only wind direction had a clear and significant effect on the interstation ratios. For cloudless days during the complete experiment two suburban sites and a rural site north of the city received about 3.5% more relative irradiation with north than south winds. The explanation for this wind direction effect is that pollutants were advected from major sources near the city center. The two urban sites exhibited only about 1% change due to north–south wind differences. The interstation comparisons for all days during the complete experiment were also partitioned by wind direction. With north winds, the suburban and northern rural sites showed about 2% to 3% more relative irradiation on all days than on cloudless days for both the summer period and the complete experiment. Finally, a climatology is presented of hourly measured irradiation averaged over all network sites during the experiment. (ERA citation 04:046055)

DOE/ET-0106 PC **A06**/MF **A01**
Department of Energy, Washington, DC. Div. of Electric Energy Systems.
Annual Program Information Notice (3rd).
Jul 79, 105p

The Division of Electric Energy Systems (EES), prepares and disseminates this program information notice on a periodic basis to inform interested organizations and individuals of the Division's progress in research and development specifically concerned with the Nation's electric energy system. The broad overall objective of the EES Program is to help ensure that the Nation's electric energy system is capable of meeting future demands reliably, with the lowest practicable energy losses, with maximum energy conservation, and in accordance with environmental and National Energy Policy (NEP) principles and policies. To this end, the EES Program focuses on RD and D designed to produce benefits in support of the national energy priorities of improvement in the efficiency of the electrical energy system (increased capacity utilization, decreased capital requirements, increased reliability, etc.); fuel shifting from oil and gas to more abundant nonrenewable resources in the near term and to renewable resources in the long-term; energy conservation; and environmental enhancement. The current EES Program consists of two major technical areas, Power Delivery and Power Supply Integration. Research activities in these two areas are listed with each entry containing the name of the study, contract number, contractor name and address, and purpose of each contract. (ERA citation 04:048513)

DOE/ET-5109-1 PC **A05**/MF **A01**
Georgia Inst. of Tech., Atlanta.
Development of an Electrical Load Demand and Response Model Based on a Rational Synthesis from Elementary Devices.
Jul 79, 89p
Contract EM-77-S-01-5109

This project develops and tests a viable methodology which can be used to synthesize models of power-system load to aid in the following major functions: on-line automatic generation control; short-term bus load forecasting; stochastic power-flow analysis; load management; operational planning; security assessment; and power-system stability analysis. The scope of the project is limited to the development of methodology with all associated simulation programs. In order to avoid functioning in a vacuum, a limited amount of information obtainable from utilities and government agencies are utilized in providing a credible data base for the validation methodology and the tuning of model parameters. Although the developed models are primarily useful in the system operation context, the potential planning uses are properly delineated. The methodology develops two types of load models--load demand and load-response. (ERA citation 04:050219)

DOE/IA-0002/01 PC **A18**/MF **A01**
Department of Energy, Washington, DC.
Joint Egypt/United States Report on Egypt/United States Cooperative Energy Assessment. Volume 1 of 5 Vols. Executive Summary, Main Report and Appendices.
Apr 79, 408p

The International Energy Assessment Program between Egypt and the U.S. was formulated from mid-March to mid-July, 1978. The assessment identified energy demand and supply options for Egypt that are consistent with its indigenous energy resources; assessed Egypt's ability to effectively use those options; and identified measures by which Egypt's energy-planning activities could be improved. The assessment addressed all known and potential energy supply options (oil, gas, coal, oil shale, hydroelectric, nuclear power, geothermal, solar, wind, and biomass). Using the Reference Energy System, two future energy supply/demand balances are constructed (for 1985 and the year 2000) and these are compared with a historical (1975) supply/demand balance. The feasibility of each of the options is established in terms of the availability of the required resources and of the processing, conversion, transport, and utilization technology. (ERA citation 04:050193)

DOE/IA-0002/03 PC **A16**/MF **A01**
Department of Energy, Washington, DC.
Joint Egypt/United States Report on Egypt/United States Cooperative Energy Assessment. Volume 3 of 5 Vols. Annexes 2–5.
Apr 79, 368p

The principal objectives of the energy assessment project for Egypt are to develop understanding of the current status of the principal energy users in Egypt's industrial and agricultural sectors; to estimate the energy demand and efficiency for each selected subsector within these major sectors; to identify opportunities for fuel type changes, technology switches, or production pattern changes which might increase the efficiency with which Egypt's energy is used both now and in the future; and based on options identified, to forecast energy efficiencies for selected Egyptian subsectors for the years 1985 and 2000. The areas studied in the industrial sector are the iron and steel, aluminum, fertilizer, chemical, petrochemical, cement, textile, and automotive manufacturing industries. Those studied in the agricultural sector concern drainage and irrigation, mechanization, and food processing. Additional information in 4 annexes include industrial/agricultural sector options; residential/commercial, transportation, and fossil fuels supply options. (ERA citation 04:050600)

DOE/IA-0002/04 PC **A13**/MF **A01**
Department of Energy, Washington, DC.
Joint Egypt/United States Report on Egypt/United States Cooperative Energy Assessment. Volume 4 of 5 Vols. Annexes 6–10.
Apr 79, 290p

Annex 6, which investigates the possible hydroelectric resources of Egypt, reveals that presently the only existing sites are on the upper Nile at the High and Aswan Dams. There are 8 sites on the Nile where it is practical to add hydroelectric generation and, of these, only 4 are feasible for immediate construction. There are also pumped-storage sites on the Nile and the Red Sea. There is also the Qattara Depression in the Western Desert which can be utilized for conventional, as well as pumped-storage generation, by bringing water from the Mediterranean Sea to the depression by canal or tunnel. The options were considered for construction of hydro plants to met the electric load growth of Egypt when other forms of energy supply would be integrated into a comprehensive supply pattern. In Annex 7, the prospective use of nuclear energy to meet Egypt's resources (uranium and thorium) to implement a nuclear energy program, and potential effects of the expanded use of nuclear energy are discussed. Annex 8 discusses solar energy (technology descriptions and impacts, solar thermal power, photovoltaics). Also wind power generation, biomass utilization, desalination, solar air conditioning and refrigeration, and cost of power from diesel engines are discussed. Annex 9 covers geothermal potentials in Egypt, discussing resources with temperatures above 180 exp 0 C; from 150 to 180 exp 0 C; from 100 to 150 exp 0 C; and with temperatures below 100 exp 0 C. Annex 10 discusses the electric power systems in Egypt. The following subjects are covered: existing electric power systems; electrical power facilities under construction or planned for construction by 1985; past and projected growth of electrical energy; distribution; and electrical power system projected from 1985 to 2000. (ERA citation 04:050241)

DOE/IA-0002/05 PC **A17**/MF **A01**
Department of Energy, Washington, DC.
Joint Egypt/United States Report on Egypt/United States Cooperative Energy Assessment. Volume 5 of 5 Vols. Annexes 11--13.
Apr 79, 390p

The principal features of the existing environment of Egypt are characterized and the main problem areas identified in Annex 11. The environmental, health, and associated social issues that must be considered in choosing from among the options available to Egypt for meeting projected future energy needs are identified. The environmental impacts associated with these options are discussed and observations are made of alternte ways to minimize environmental insults. Annex 12, Manpower, analyzes the energy-related manpower situation of Egypt. Manpower education and training resources of Egypt; the existing manpower base of Egypt; manpower needs of the energy strategies; a comparison of manpower needs and existing manpower base; and the underlying economic and social factors that will make Egypt energy facility development very difficult to plan and execute are discussed. Annex 13 summarizes a preliminary analysis of the capital, labor, materials, and equipment resources required to implement alternative Egyptian energy futures and documents the assessment of several Egyptian energy development programs selected by the DOE. It begins with brief overviews of the ESPM model and data base. It then describes the method by which the system was adapted to Egyptian conditions and the results of this modification. The comparison Case energy development program is described, followed by a summary of ESPM-derived facility and resource requirements. Finally, the sensitivity of these results to several alternative energy strategies is illustrated. (ERA citation 04:050161)

DOE/JPL-1060-12 PC **A03**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Parabolic Concentrating Collector: A Tutorial.
V. C. Truscello. 15 Feb 79, 43p JPL-PUB-79-7
Contract EX-76-A-29-1060

A tutorial overview of point-focusing parabolic collectors is presented. Optical and thermal characteristics of such collectors are discussed. Data representing typical achievable collector efficiencies are presented and the importance of balancing collector cost with concentrator quality is argued through the development of a figure of merit for the collector. The impact of receiver temperature on performance is assessed and the general observation made that temperatures much in excess of 1500 to 2000 exp 0 F can actually result in decreased performance. Various types of two-axis tracking collectors are described, including the standard parabolic deep dish, Cassegrainian and Fresnel, as well as two forms of fixed mirrors with articulating receivers. The present DOE program to develop these devices is briefly discussed, as are present and projected costs for these collectors. Pricing information is presented for the only known commercial design available on the open market. (ERA citation 04:048457)

DOE/TIC-10127 PC **A06**/MF **A01**
Department of Energy, Washington, DC. Office of State and Local Programs.
Report to the Congress on the Coordination of Federal Energy Conservation Programs Involving State and Local Governments.
May 79, 116p

During the last four years, the Congress has enacted four major laws authorizing the Federal government to develop and implement specific energy-conservation programs. These laws and the programs they authorize are: Energy Policy and Conservation Act of 1975, as amended (State Energy Conservation Program); Energy Conservation and Production Act of 1976 (Weatherization Assistance Program); Energy Research and Development Administration Authorization Act of 1977 (Energy Extension Service); and National Energy Conservation Policy Act of 1978, (Schools, Hospitals, and Local Government and Public Care Institutions Program and Residential Conservation Service). In addition, DOE is conducting three other energy-conservation programs that involve State and local governments. These programs are: Urban Waste Program (Department of Energy Act of 1978--Civilian Applications); Community Systems Program (Federal Nonnuclear Energy Research and Development Act of 1974); and Appropriate Technology Program (Energy Research and Development Appropriation Authorization of 1977). These programs are administered through the Office of the Assistant Secretary for Conservation and Solar Applications (CS). A description of the coordination activities related to these programs, which constitute all major CS energy conservation programs involving State and local governments, make up the main body of this report. Further, during the preparation of this report it was recognized that other DOE offices and other Federal agencies are attempting to address the U.S. energy problem by implementing a variety of efforts intended to help reduce energy demand. Based on a survey of DOE and other Federal agencies, 50 additional programs which have as a primary goal the provision of a service related to reducing energy demand have been identified throughout the Federal government and are included in this report. (ERA citation 04:046799)

DOE/TIC-10133 PC **A05**/MF **A01**
Department of Energy, Washington, DC.
Second Program Plan for DOE'S Participation in the IEA Working Party on Energy Conservation Research and Development.
Jan 79, 77p

This program plan for DOE participation in the Working Party on Energy Conservation R and D covers DOE's FY 1979 commitments to the signed and new implementing agreements. The plan describes each implementing agreement and related annexes, including the tasks, project status, other participants in the agreement, and financial arrangements. Chapter 1 reviews current and planned DOE commitments to existing implementing agreements; Chapter 2 reviews planned DOE commitments to new implementing agreements. Appendix A explains how DOE commitments to IEA projects interact with the Federal budget cycle; Appendix B discusses the mechanisms for establishing implementing agreements and annexes; Appendix C is a list of the members of the Working Party on Energy Conservation R and D. The Working Party on Energy Conservation R and D is presently sponsoring work under implementing agreements in 9 areas: buildings and community systems; energy conservation in building complexes; energy cascading; heat pump systems; advanced heat pumps; combustion; heat transfer and heat exchangers; energy storage; cement manufacture. DOE has made commitments to all these agreements and is currently participating in 12 of the 13 annexes under way. (ERA citation 04:048745)

DOE/TIC-10158 PC **A03**/MF **A01**
Tennessee Univ., Knoxville. Environment Center.
Solar Energy: An Annotated Bibliography of Selected Literature.
N. E. Collins, and J. L. Finney. Sep 77, 35p

This bibliography lists the best of the solar collection at the University of Tennessee Environment Center Library. (ERA citation 04:046052)

DOE/TIC-10168(V.2) PC **A12**/MF **A01**
Charles River Associates, Inc., Boston, MA.
Procedures for Independent Analyses of Electric Energy and Peak Loads by State Agencies.
Jul 78, 252p
Contract EM-77-C-01-8725

This report reviews existing studies and forecasting models for energy sales and peak demand. The review is focused toward approaches to forecasting that can be implemented by state public utility commissions (PUCs) and other state agencies with interests in forecasting the effects of energy policies on electricity sales and peak demands. As such it points toward model design and development tasks. The selection of studies focuses on those which are leading examples of state-of-the-art approaches of some potential applicability to the modeling problems of state PUCs and energy agencies. A conclusion drawn from this survey is that several important aspects of electricity demand modeling have not yet been treated effectively. Another conclusion is that the state models must be relatively sophisticated in order to be reliable forecasting tools. PUCs with little experience in forecasting and data management will find it necessary to increase their analytical capabilities in order to use the models. Chapters 2 to 4 of this report review electric energy demand models specific to the residential, commercial, and industrial customer loads. Chapter 5 critically surveys methods of constructing peak-load forecasts. The final two chaptrs sample electricty demand forecasting procedures currently used by state agencies and utilities. (ERA citation 04:050221)

DOE/TIC-10365 PC **A02**/MF **A01**
Federal Energy Administration, Washington, DC.
Proposed Energy Conservation Contingency Plan: Emergency Restrictions on Outdoor Gas Lighting. Authorities Need, Rationale, Operation.
Apr 77, 25p

The test of the Plan is presented and the need, rationale, and operation of the plan are discussed. The restrictions on outdoor natural gas lighting contained in the plan were selected following a careful analysis of safety and security considerations. Street and highway lights are not included in the restrictions due to their importance in reducing the potential for crime and motor vehicle accidents. (ERA citation 04:048815)

DOE/TIC-10369 PC **A05**/MF **A01**
National Association of Counties, Washington, DC.
Impact of State Mandated Thermal Efficiency Standards on Counties.
Mar 77, 76p

A study to determine what effect the implementation of state mandated Thermal Efficiency Codes has had, if any on counties is discussed. In July 1976, there were 19 states with authority to regulate energy use through the regulation of the design and the construction of new buildings. In 16 states a state-wide building code was a vehicle for energy regulations. Three states (California, Nevada, and New York) have energy regulations separate from state-wide building code authority. Five counties selected for study are: Lane County, Oregon; Mecklenburg County, North Carolina; Montgomery County, Maryland; Sacremento County, California; and Washington County, Minnesota. The energy situation in each state was examined to reveal supply and consumption patterns and shortages, if any. It is concluded that counties that have a building code and an experienced staff can accommodate and energy code which establishes certain standard practices as a minimum. (ERA citation 04:048816)

DOE/TIC-10445 PC **A07**/MF **A01**
Federal Energy Administration, Washington, DC.
Report to Congress Pursuant to Section 8(F)(L) of the Emergency Petroleum Allocation Act.
23 Feb 77, 149p

This report responds to the reporting requirement of Section 8(f)(l) of the Emergency Petroleum Allocation Act (EPAA) as amended by the Energy Policy and Conservation Act (EPCA) and Energy Conservation and Production Act (ECPA). Chapter II of this report describes in detail the requirements of the various laws and the actions that the Federal Energy Administration (FEA) has taken or will take to implement these laws through regulation. Chapter III provides details of FEA's rationale followed in implementing these provisions of the law and quantifies, where possible, the impacts believed to have resulted from the legislation in 1976 on price, production, supply and the economy. Since the eleven month period starting with February 1976 and ending in December of that year is short compared to the time required for the effects of price on production to be realized, forecasts of impacts are provided for 1980 and 1985 to offer a further dimension in understanding the effects of these provisions. Four appendices to Chapter III supply the details of the analytical methodology used. Finally, Chapter IV assesses the possible impacts of these provisions on future domestic crude oil production through an analysis of the response of the leading indicators of domestic crude oil production to changes in price. (ERA citation 04:048126)

DOE/TIC-10480 PC **A10**/MF **A01**
Federal Energy Administration, Washington, DC.
Private Grievances and Redress. Quarterly Report, January 1, 1977--March 31, 1977.
1977, 217p

During the period January 1 through March 31, 1977, five petitions for Special Redress Relief were received by the FEA. Actions and results on these cases are indicated. During the second quarter of 1977, the Office of Exceptions and Appeals resolved 574 cases by Decision and Order and dismissed 81 other cases. The Appendix discusses these cases indicating the facts involved in the case, the determination reached, and the basis for the decision. (ERA citation 04:048769)

DOE/TIC-10488 PC **A04**/MF **A01**
Federal Energy Administration, Washington, DC.
Energy Cost Reduction for Commercial Printers.
15 Jul 77, 57p

This handbook was developed to help commercial printers cut the cost of energy in their business establishments. It shows how to recognize and act on energy waste in: interior and security lighting; space heating; air conditioning; process; and general plant maintenance. The distribution of energy use varies widely among printing facilities, but certain conclusions can be drawn. Process energy, generally electricity, typically consumes 30 to 50% of total energy costs in the operation of presses and trimmers, compressed air generation, and production of binders. Lighting is a significant expense, and may consume up to 33% of energy expenses. Heating and air conditioning are seasonal and show the expected climatic variations - from 15 to 38%. Hot water generally represents 1 to 2% of total costs and is usually represented in heating costs. Detailed energy audits were performed at printing plants in various US locations. Recommendations, based on these audits, are made for implementing low-cost energy conservation measures in printing plants. (ERA citation 04:048855)

DOE/TIC-10537 PC **A03**/MF **A01**
Battelle Columbus Labs., OH.
Development and Establishment of Energy Efficiency Improvement Targets for Primary Metal Industries: SIC 33. Final Target Documentation.
H. W. Lownie, Jr., D. J. Maykuth, T. J. McLeer, J. G. Kura, and J. Varga, Jr. 18 Feb 77, 31p

The final report is presented on a study of energy efficiency goals for the metals industry (SIC 33) to achieve significant energy conservation in this industry by 1980. The methodology used is reviewed. The results showed that the apparent consumption of energy by SIC 33 in 1972 was about 4,246 x 10 exp 12 Btu. If the industry operated in the target year (1980) at the same energy efficiency (units of output per Btu) as in 1972, because of anticipated growth in units of output the energy consumption in the target year would be about 5,167 x 10 exp 12 Btu. Based on the data and information available, and based solely on technological feasibility and economic practicability (without the influence of special circumstances), it is judged that SIC 33 could lower its consumption of energy in the target year to 4,456 x 10 exp 12 Btu. This represents a conservation of 13.8% in energy use per unit of output from 1972 to the targt year. Special circumstances are defined as those beyond the control of establishments within SIC 33. The most significant is the need to comply with environmental-control regulations. Another is the declining grade of certain ores. After consideration of special circumstances over which the industry has no control, it is judged that SIC 33 could lower its consumption of energy in the target year to 4,674 x 10 exp 12 Btu. This represents a net conservation of 9.5% (10% when expressed to the nearest integer) in energy use per unit of output from 1972 to the target year. (ERA citation 04:048847)

DOE/TIC-10545 PC **A11**/MF **A01**
Federal Energy Administration, Washington, DC.
Market Analysis and Program for Use for Energy Conservation Manuals: A Marketing Plan. Final Report.
25 Feb 77, 245p

The FEA, with a mission to analyze total national energy usage, formulate policy, and stimulate actions that will increase domestic energy supply and decrease energy demand, decided to develop effective energy conservation manuals for decision makers in existing buildings. The manuals developed are: Building Owner's and Manager's Guide to Energy Conservation; Building Operator's Guide to Energy Conservation; and Architect's and Engineer's Guide to Energy Conservation. The background and scope of the entire project which led to the development of the manuals is discussed in the introduction of this publication. Part II, Market Analysis, provides insight into the character of the designated audiences for the manuals. Part III, Program for Use, is a marketing and promotion plan for the manuals. (ERA citation 04:048817)

DOE/TIC-10591 PC **A02**/MF **A01**
Northwest Colorado Council of Governments, Frisco.
Energy Impact: A Community in Action. A Case-Study Project. An Executive Summary.
Apr 77, 21p

In response to the fossil-fuel shortage in the US brought to the crisis stage by the 1973 Arab oil boycott, the vast coal reserves of the Western US became subject to exploitation. The towns in and near which the coal deposits were located have had to absorb the impact of the people and industry that followed. The impact from the development of a new energy source can be viewed as short-term. Once the industry is in place and the mechanism exists for regular revenue generation, the community can support itself through normal revenue sources. But initially, communities must be provided with transition revenue sources to help them accomodate the impacts of energy development. This report examines one impacted community and describes the process by which the community is dealing with its problems and utilizing the various services available to impacted areas. The process is an implementation of the Impact Assistance Team concept. (ERA citation 04:046769)

DOE/TIC-10683 PC **A02**/MF **A01**
Federal Energy Administration, Washington, DC.
Environmental Impact Determination: Submitted to FEA by the State of New Mexico for Approval and Fundng under the Provisions of Title III, Part C of the Energy Policy and Conservation Act; State Energy Conservation Program.
22p

A review of New Mexico's proposed conservation plan was completed. The target of the New Mexico plan, as a whole, is to reduce the State's 1980 energy consumption by 42.266 trillion Btu. This, measured against the 1980 baseline projection for New Mexico of 605.79 trillion Btu equals a 6.97% savings. Approximately 4.752 trillion Btu (11.2%) of savings come from the five required program measures, which involve state building codes and thermal efficiency standards, lighting standards for public buildings, life cycle cost analysis (procurement), increase in transit level of transportation systems, and right turn on red. No significant environmental impacts were expected from implementation of the plan. (ERA citation 04:050179)

DOE/TIC-10685 PC **A02**/MF **A01**
Federal Energy Administration, Washington, DC.
Environmental Impact Determination: Submitted to the FEA by the State of Minnesota for Approval and Funding under the Provisions of Title III, Part C of the Energy Policy and Conservation Act; State Energy Conservation Program.
23p

Energy savings to result from implementation of the Minnesota plan are estimated at 122.3 trillion Btu or 8.9% of the FEA baseline forecast for Minnesota, for 1980, of 1361.1 trillion Btu. However, not all of these savings are to result from program measures for which Minnesota is requesting approval or funding (total or partial) under provisions of the SECP. Table IV-B (appended) of the plan submission lists the SECP program measures and their related savings. These savings amount to 71.2 trillion Btu or 5.2% of the 1980 projection. Of this total, 17.4 trillion Btu (or 24.4% of savings) are attributed to the five required program measures (state building codes and thermal efficiency standards, lighting standards for public buildings, life cycle cost analysis, increase in transit level of transportation systems, right turn on left). The remaining 53.8 trillion Btu are realized from some 14 additional measures. Of the 71.2 trillion Btu, 9.9 trillion Btu are electrical generation fuels saved (6.2 of coal and 3.7 oil); this is about 14% of primary fuel savings. No significant adverse environmental impacts were expected from implementation of the plan. (ERA citation 04:050181)

DOE/TIC-10691 PC **A02**/MF **A01**
Federal Energy Administration, Washington, DC.
Environmental Impact Determination: Submitted to the FEA by the State of Virginia for Approval and Funding under the Provisions of Title III, Part C of the Energy Policy and Conservation Act; State Energy Conservation Program.
24p

Virginia's proposed conservation plan was completed. The impact of the Virginia plan, as a whole, will be - if successful - to reduce the state's 1980 energy consumption by 79.84 trillion Btu. This, measured against the 1980 baseline projection for Virginia of 1,587.6 trillion Btu equals a 5.01% savings. These savings, measured across end-use sectors, resulted in an absolute decrease in every environmental residual measured from each fuel consumed in each sector. The five required program measures (state building codes and thermal efficiency standards, lighting standards for public buildings, life-cycle-cost analysis, increase in transit level of transportation systems, right turn on red) account for 21.01 trillion Btu or about 26% of total savings and 58.83 trillion Btu come from additional measures. The plan contains a total of 20 program measures all of which can be grouped into the following: building thermal efficiency, industrial, transportation, lighting efficiency, other. (ERA citation 04:050169)

DOE/TIC-10696 PC **A03**/MF **A01**
Federal Energy Administration, Washington, DC.
Environmental Impact Determination: Submitted to FEA by the State of California for Approval and Fundng under the Provisions of Title III, Part C of the Energy Policy and Conservation Act; State Energy Conservation Program.
45p

A review of California's proposed conservation plan was completed. The impact of the California plan, as a whole, will be - if successful - to reduce the State's 1980 energy end use consumption by 386.71 trillion (10 exp 12) Btu; of this, 313.2 x 10 exp 12 Btu will be non-electrical and 73.51 x 10 exp 12 Btu will come from the electrical sector. Total savings will amount to 542.71 trillion Btu (313.2 non-electrical and 229.51 in fuels used to generate electricity). This, measured against the FEA 1980 baseline projection for California of 6896.58 trillion Btu, equals a 7.7% savings. An additional benefit of implementing the plan is the reduction of environmental degradation that results from the conversion, distribution, and use of energy; a quantified estimate of these benefits is presented. (ERA citation 04:050184)

DOE/TIC-10697 PC **A02**/MF **A01**
Federal Energy Administration, Washington, DC.
Environmental Impact Determination: Submitted to FEA by the State of Arizona for Approval and Fundng under the Provisions of Title III, Part C of the Energy Policy and Conservation Act; State Energy Conservation Program.
19p

A review of Arizona's proposed conservation plan was completed. The target of the Arizona plan, as a whole, is to reduce the state's 1980 energy consumption by 38.4599 trillion Btu. This, measured as against the 1980 baseline projection for Arizona of 793.94 trillion Btu equals a 4.8% savings. A savings of 29.4% came from the five required program measures. No significant adverse environmental impacts were expected from implementation of the plan. In Arizona, it is seen that the residential and commercial sectors account for about 32.4% of total energy consumption and (through lighting and thermal efficiency programs) about 76.1% of projected savings; the industrial sector is responsible for 30.1% of total consumption and about 15.5% of savings; while transportation uses about 37.5% of the total consumption and accounts for about 8.4% of total savings; and about 35.7% of all fuels consumed are for the purpose of generating elec-

tricity purchased by the residential, commercial, and industrial sectors. (ERA citation 04:050185)

DOE/TIC-10698 PC **A02**/MF **A01**
Federal Energy Administration, Washington, DC.
Environmental Impact Determination: Submitted to FEA by the State of Arkansas for Approval and Fundng under the Provisions of Title III, Part C of the Energy Policy and Conservation Act; State Energy Conservation Program.
20p

A review of the Arkansas proposed conservation plan was completed. The target of the Arkansas plan, as a whole, is to reduce the State's 1980 energy consumption by 86.411 trillion Btu. This, measured against the 1980 baseline projection for Arkansas of 917.10 trillion Btu equals a 9.42% savings. 10.081 trillion Btu (11.9%) of Arkansas' savings come from the five required program measures, which involve state building codes and thermal efficiency standards, lighting standards for public buildings, life-cycle-cost analysis, increase in transit level of transportation systems, right turn on red. These savings, measured across end-use sectors resulted in an absolute decrease in every environmental residual measured from each fuel consumed within each sector. (ERA citation 04:050186)

DOE/TIC-10699 PC **A03**/MF **A01**
Federal Energy Administration, Washington, DC.
Environmental Impact Determination: Submitted to the FEA by the State of Michigan for Approval and Funding under the Provisions of Title III, Part C of the Energy Policy and Conservation Act; State Energy Conservation Program.
39p
Portions of document are illegible.

A review of Michigan's proposed conservation plan has been completed. The target of the Michigan plan, as a whole, is to reduce the state's 1980 energy consumption by 258.9 trillion Btus. This, measured against the 1980 baseline projection for Michigan of 3,299.78 trillion Btu equals a 7.8% savings. Approximately 53 trillion Btu (20.5%) of savings will come from the five required program measures. It is seen that the residential and commercial sectors account for about 41% of total energy consumption and (through lighting and thermal efficiency programs) about 35% of projected savings; the government sector (where savings come predominantly from improved building efficiency) accounts for another 7%. The industrial sector is responsible for 34.5% of total consumption and about 32% of savings; while transportation uses about 24% of the total consumption and accounts for about 13% of total savings. About 26% of all fuels consumed are for the purpose of generating electricity purchased by the residential, commercial, and industrial sectors. No significant adverse environmental impacts were expected from implementation of the plan. (ERA citation 04:050187)

DOE/TIC-10700 PC **A02**/MF **A01**
Federal Energy Administration, Washington, DC.
Environmental Impact Determination: Submitted to the FEA by the District of Columbia for Approval and Funding under the Provisions of Title III, Part C of the Energy Policy and Conservation Act; State Energy Conservation Program.
21p

A review of the District of Columbia's proposed conservation plan has been completed. The target of the District of Columbia plan, as a whole, is to reduce the District's 1980 energy consumption by 21.751 trillion Btu. This, measured against the 1980 baseline projection for the District of 239.64 trillion Btu equals a 9.07% savings. Approximately 8.539 trillion Btu (39.2%) of D.C.'s savings come from the five required program measures, which involve state building codes and thermal-efficiency standards, lighting standards for public buildings, life-cycle-cost analysis (procurement), increase in transit level of transportation systems, and right turn on red. No significant adverse environmental impacts were expected from implementation of the plan. (ERA citation 04:050188)

DOE/TIC-10701 PC **A02**/MF **A01**
Federal Energy Administration, Washington, DC.
Environmental Impact Determination: Submitted to the FEA by the State of Utah for Approval and Funding under the Provisions of Title III, Part C of the Energy Policy and Conservation Act; State Energy Conservation Program.
18p

The Energy Policy and Conservation Act establishes the State Energy Conservation Program. An Environmental Assessment of the probable nationwide impacts of the FEA. A review of Utah's proposed conservation plan was completed. The target of the Utah plan, as a whole, is to reduce the State's 1980 energy consumption by 33.9 trillion Btu. This, measured against the 1980 baseline projection for Utah of 554.07 trillion Btu equals a 6.11 percent savings. Approximately 6.8 trillion Btu (20.1%) of Utah's savings come from the five required program measures, which involve state building codes and thermal efficiency standards, lighting standards for public buildings, life cycle cost analysis (procurement), increase in transit level of transportation, and right to turn on red. No significant environmental impacts were expected from implementation of the plan. (ERA citation 04:050189)

DOE/TIC-10702 PC **A02**/MF **A01**
Federal Energy Administration, Washington, DC.
Environmental Impact Determination: Submitted to the FEA by the State of Pennsylvania for Approval and Funding under the Provisions of Title III, Part C of the Energy Policy and Conservation Act; State Energy Conservation Program.
20p

A review of Pennsylvania's proposed conservation plan was completed. If the Pennsylvania goal is achieved, the impact of the plan, as a whole, will be to reduce the State's 1980 energy consumption by 301.61 trillion (10 exp 12) Btu; of this, 239.50 x 10 exp 12 Btu will be non-electrical and 62.11 x 10 exp 12 Btu will come from fuels used to generate electricity. This, measured against the FEA 1980 baseline projection for Pennsylvania of 4,360.96 trillion Btu, equals a 6.9% savings. These savings, measured across end-use sectors, result in an absolute decrease in every environmental residual measured from each fuel consumed within each sector. This should indicate that conservation opportunities are also fairly evenly distributed. Judging from the Commonwealth's plan, this is, indeed the case. The residential and commercial sectors combined (where building heating, lighting, and cooling are the largest energy users) account for about 31% of end use consumption; 34.6% of targeted savings are from this area. The transportation ratio is 20.2% to 13.4% and for industry it is 48.8 to 52. (ERA citation 04:050190)

DOE/TIC-10704 PC **A04**/MF **A01**
Federal Energy Administration, Washington, DC.
Environmental Impact Determination: Submitted to FEA by the State of Oklahoma for Approval and Fundng under the Provisions of Title III, Part C of the Energy Policy and Conservation Act; State Energy Conservation Program.
71p

Oklahoma has prepared a detailed and comprehensive Environmental Assessment (EA) of its proposed State Energy Conservation Plan. A review of the plan and the EA was completed by FEA. It is concluded that energy savings to result from implementation of the Oklahoma plan are estimated at 97.25 trillion Btu. Of this total 41.58 trillion Btu will be non-electrical, 16.72 trillion will be net electrical end use consumption and 38.95 trillion will constitute energy lost in electrical generation. Put another way, 55.67 trillion Btu will be saved from fuels used to generate electricity; net (end use) savings will amount to 58.30 trillion Btu. Of the latter, 16.60 will come from the five required program measures and 41.70 from others. No significant adverse environmental impacts were identified from implementation of the plan. (ERA citation 04:050192)

DOE/TIC-10772 PC **A10**/MF **A01**
Federal Energy Administration, Washington, DC.
Proposed Energy Conservation Contingency Plan: Emergency Restrictions on Outdoor Gas Lighting. Economic Impact Analysis Environmental Impact Assessment.
Apr 77, 221p

The economic impact of restrictions on the use of illuminated advertising and certain gas lighting is described. The proposed plan would reduce demand for electricity and natural gas. Advertising expenditures would shift to other media - radio, newspapers. No significant effect upon aggregate retail sales is anticipated. Microeconomic effects of the measure are negligible and all effects are minor and/or beneficial. (ERA citation 04:048819)

DOE/TIC-10775 PC **A14**/MF **A01**
Federal Energy Administration, Washington, DC.
Proposed Gasoline and Diesel Fuel Rationing Contingency Plan. Economic Impact Analysis.
Apr 77, 308p

An analysis of the economic impacts of FEA's proposed Gasoline and Diesel Fuel Rationing Plan is presented. The various components of the proposed plan is evaluated in terms of the effect on the economic factors identified in the 1975 Energy Policy and Conservation Act. The scope of the study was confined to the economic impacts of the rationing plan relative to an economy already impacted by the embargo and the mandatory allocation program. Time constraints imposed on the analysis required reliance on secondary data and a qualitative approach in some areas. (ERA citation 04:050196)

DOE/TIC-10801 PC **A05**/MF **A01**
Metrostudy Corp., Washington, DC.
Commercial Sector Energy Consumption: Analysis and Recommendations for Data Collection. Final Report.
15 Feb 77, 92p

Alternative methods for collecting or estimating energy consumption data in the commercial sector are analyzed. The SIC System codes provide the best existing system for developing uniform data. Data analysis in the commercial sector is difficult because a large number of establishments rent space and do not pay for energy consumption directly. The problems of allocating consumption by SIC code within office buildings or shopping malls is addressed in Chapter II along with a discussion of the means, costs, and limitations of such a reporting system. A discussion of costs and problems of developing data from a survey of commercial users is provided in Chapters III and IV. Chapter V discusses improving consumption data by fuel type and data collection on functional end use. Status of state programs is reviewed in an appendix. (ERA citation 04:048841)

DOE/TIC-10816 PC **A09**/MF **A01**
TRW Systems and Energy, Washington, DC.
Analysis of Effectiveness of Implementation Strategies.
J. Savadelis, R. Hilton, J. Ross, G. Townsend, and R. Kinst. 24 Oct 77, 184p

A program for State Energy Conservation Plans was established and designed to promote the conservation of energy and reduce the rate of growth of energy demand. This study collects information aimed at evaluating the effectiveness of each implementation strategy. The program measures submitted by the states were classified within one of five sectors: transportation, industrial/agricultural, buildings, utilities, or miscellaneous. The characteristics of and unique constraints to energy conservation are detailed for each sector. Within each sector, information provided for each program measure included: distribution of implementation strategies, definition of compliance, average compliance, most common implementation strategy, most effective implementation strategy, states that submitted programs which did not employ the most common strategy, potentially exemplary projects, and innovative and promising strategies or program measures. Educational measures appeared to be the most commonly employed strategy. The program is voluntary; however, in order for a state to be eligible for financial assistance, it must adhere to the program guidelines which include: submitting programs on 5 required measures (thermal and light standards; car-

pool, vanpool, or mass transit; right-turn-on-red; and procurement practices) and achieving 5% savings of 1980 consumption. (ERA citation 04:044908)

FE/EES-79/5 PC **A03**/MF **A01**
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
Bibliography of Investment Costs, Operating Costs, and Related Economic Information for Fossil-Energy-Related Industries, January--December 1978.
L. A. Conley. Mar 79, 42p

This report, covering the period January through December 1978, contains 169 abstracts of articles that deal with investment and operating costs, cost estimation methods and theory, developments in technology, and the status of construction projects. The abstracts are of articles from 22 journals. In addition, references are included to selected reports that have been issued through the National Technical Information Service, Springfield, VA. Most of the articles deal with investment and operating costs related to the development of fossil-energy sources. Coal-conversion and coal-mining costs are considered extremely important, since supplies of imported oil are uncertain and because costs of imported oil are rising. (ERA citation 04:048771)

GJO-100(79) PC **A07**/MF **A01**
Department of Energy, Grand Junction, CO. Grand Junction Office.
Statistical Data of the Uranium Industry.
1 Jan 79, 136p
Contract EY-76-C-13-1664

The Statistical Data of the Uranium Industry is a compilation of historical facts and figures through 1978. These statistics are based primarily on information provided voluntarily by the uranium exploration, mining, and milling companies. This publication is compiled and updated annually by the Grand Junction Office (GJO). Most of the numbers reported herein have been rounded. The production, reserves, drilling, and production capability information has been reported in a manner which avoids disclosure of proprietary information. The nomenclature of DOE's forward cost ore reserve estimates has been changed to reserve estimates because ore usually connotes material which can be extracted at a profit. Also, because of some confusion, we emphasize that this book follows the common industry practice of reporting mine production, reserves, and potential resources as tons of U sub 3 O sub 8 in ore and reporting mill production as tons of U sub 3 O sub 8 in concentrate. Uranium inventories for Texas have been added. The distribution of $50 reserves by mining method in producing and nonproducing properties has been newly included. An analysis of costs associated with production capability has been added (Appendix B). A probabilistic analysis of reserves has been introduced this year. The technical methodology for this analysis is outlined, and probability distribution curves for the 1/1/79 $30 and $50 reserves are presented. (ERA citation 04:048157)

HCP/I6346-01/1 PC **A11**/MF **A01**
Planco, Inc., Dallas, TX.
Survey of the Research into Energy-Economy Interactions. Volume 1. Survey.
R. Coates, D. Hanson, S. Juenger, and J. Kennington. Apr 79, 248p
Contract EI-78-C-01-6346

Part I of this volume consists of a detailed and comprehensive review of recent (1960 to present) and on-going research into energy-economy interactions. The review focuses on the results from theoretical and empirical analyses of energy-macroeconomic interactions, the different methodologies used, and the conceptual problems in this research. The review is organized around a number of key energy variables impacting the economy. These variables include the supply of energy, the price of energy, the world price of oil, energy capital requirements, energy R and D, conservation regulations, and stockpiling. Part II begins with a chapter summarizing energy-economy modeling. This chapter provides a conceptual framework for analyzing energy-economy models, discusses the general features and methodologies of a large number of models, and summarizes the state of the art in modeling energy-economy interactions. This survey chapter is followed by detailed reviews of six different energy-economy models: Manne's ETA-MACRO and ETA, Hudson--Jorgenson's LITM, PILOT, Wharton Annual Energy, Reister--Edmonds, and Berkeley (Glassey--Benenson). Each review describes the methodology and general features embodied in the model, summarizes the types of energy-economy interactions addressed, and assesses the capabilities of the model. (ERA citation 04:050158)

HCP/I6346-01/2 PC **A18**/MF **A01**
Planco, Inc., Dallas, TX.
Survey of the Research into Energy-Economy Interactions. Volume 2. Annotated Bibliography.
R. Coates, D. Hanson, S. Juenger, and J. Kennington. Apr 79, 425p
Contract EI-78-C-01-6346

This annotated bibliography contains abstracts of nearly 400 articles, books, and reports cited in Planco's Survey of the Research into Energy-Economy Interactions: Volume I. It represents the end result of an exhaustive search for recent (1960 to present) and on-going research into energy-economy interactions. The search process uncovered more than 900 articles, books, and reports on energy and the economy. Of these, only the research directly related to macroeconomic energy-economy interactions was selected. In preparing the abstracts, every effort was made to use the authors' own summaries or excerpts from the publications. Not all of the publications cited in Volume I of the survey were abstracted. (ERA citation 04:048739)

HCP/T4016-1 PC **A04**/MF **A01**
Northrop Services, Inc., Huntsville, AL.
Solar-Climatic Statistical Study. Summary Report. Volume 1 of 2.
Feb 79, 60p
Contract EG-77-C-01-4016

Design and operation of large scale solar and wind energy conversion systems should be based, in part, on knowledge of expected solar and wind power trends. For this purpose, historic data at 26 (SOLMET) National Weather Service stations were processed to provide preliminary planning data, in the form of statistical information, for selected daily average solar and wind conditions occurring and persisting for time periods of interest. Solar data are global radiation incident on a horizontal surface, and wind data represent wind power normal to the air flow. Empirical probabilities were constructed from the historic solar and wind data to provide a reasonable inference of the chance of similar climatological conditions occurring at any given time in the future. (Diurnal wind power variations were also considered.) Data used to obtain the daily average solar and wind power probabilities were combined into monthly averages and are presented in this volume as summary results. Average monthly, seasonal and annual solar and wind power trends were prepared to provide an overview for identifying areas for further investigation. (ERA citation 04:049601)

IVA-137 PC **A07**/MF **A01**
Ingeniors Vetenskaps Akademien, Stockholm (Sweden).
Natural Gas in the Swedish Energy Policy.
L. Hjort. 1978, 141p
In Swedish.
U.S. Sales Only.

The use of natural gas in Sweden has been discussed for about ten years in Sweden. This report will give a summary of questions which are important in the energy policy when determining if natural gas ought to be introduced in Sweden as a fuel. (ERA citation 04:048743)

LA-UR-79-1599 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Energy Planning with Solar and Conservation: Individual Values and Community Choice.
S. A. Noll, F. Roach, and L. Palmiter. 1979, 6p
CONF-790541-24
Contract W-7405-ENG-36
International Solar Energy Society meeting, Atlanta, GA, USA, 28 May 1979.

Conflict among the priorities of individuals, private sector businesses, and government entities makes the transition to a renewable energy-resource base a difficult one. These conflicts are intensified by the overwhelming number of externalities created by the actions of each of these decision making groups. This paper explores the nature of some of these conflicts and externalities and gives an illustrative example of the benefits to be derived from community energy planning. Community energy programs have the potential to stimulate household and community income, create job opportunities, develop a more resilient energy economy, and help mitigate environmental deterioration. (ERA citation 04:050147)

LA-7909-MS PC **A04**/MF **A01**
Los Alamos Scientific Lab., NM.
Energy Policy and Decision Analysis: New Concepts and Mechanisms.
E. L. Kaufman, and R. W. Vogel. Jul 79, 52p
Contract W-7405-ENG-36

The US has entered an administrative era much more complex than that which existed earlier. The present technique used for policymaking and public problem solving was developed decades ago and is no longer appropriate. Today's energy dilemmas are symptomatic of an administrative management system that cannot function within the necessary time frames. Similar dilemmas can be expected in other categories that cut across government organizational structure. If questions of energy independence, or at what rate can imports be reduced, while maintaining a reasonable rate of growth, are important, the technique presented offers a means for answer. However, commitment to change is required. The change is not merely the exchange of bureaucracies for the sake of change, but a switch in the manner in which dependable decisions are made. This paper describes relevant portions of the energy-management problem and a technique wherein objective energy policy analysis can be performed in a short time frame. A precept for decision criteria is proposed and a set of fundamental concepts are described that allow quantitative assessment of policy and decision consequences for the total energy system. A decision conferencing is described wherein the technical assessment is combined with the political acumen of experienced decision makers to allow the best public-interest choice to be made. A rationale is also presented for the organizational placement of the analysis function, outside of government or industry. This placement will provide a much needed level of credibility, higher than that which presently exists, and will reduce bias and equitably balance the needs of the public, government, and industry. (ERA citation 04:050210)

LBL-8615 PC **A11**/MF **A01**
EDAW, Inc., San Francisco, CA.
Environmental and Economic Effects of Subsidence: Category 4, Project 1. Final Report.
V. F. Viets, C. K. Vaughan, and R. C. Harding. May 79, 242p
Contract W-7405-ENG-48

A list of more than 70 subsidence areas was screened to select those areas which seemed to have the best potential for providing reliable data. The screening process is described in an appendix. Nine areas were selected for detailed case studies to collect all available data on the environmental and economic effects of the subsidence. Available information from the subsidence areas not selected as case studies was tabulated for each area and is included in an appendix. The nine case study areas are: Arizona; San Joaquin Valley, California; Baldwin Hills, California; Santa Clara Valley, California; Wilmington, California; Las Vegas Valley, Nevada; Houston-Galveston area, Texas; Mexico City, Mexico; and Wairakei, New Zealand. (ERA citation 04:049826)

N79-31764/0 PC **A05**/MF **A01**
Chicago Univ., IL. Enrico Fermi Inst.
Winston Solar Concentrators and Evaluation Support. Phase 2: Non-Imaging Concentrators for Space Applications.
Final Report, Oct. 1977 - Jul. 1978.
R. Winston, J. Ogallagher, and P. Greenman. 28 Aug 78, 81p NASA-CR-162279

Contract JPL-954563
Subm-Prepared for JPL.

A 4.67X, plus or minus 5 deg. compound parabolic concentrator (CPC) for a large photovoltaic array in space was analyzed. The design was demonstrated to be effective in achieving a net power gain which can be varied from more than a factor of 3 down to approximately unity. A method for reducing nonuniformities in illumination to a given desired level was found. The effectiveness of this method, which involves the introduction of a degree of non-specularity in the reflector surface, was confirmed by direct measurements with prepared foil reflectors in a CPC in terrestrial sunshine as well as by computer ray tracing. Further ray tracing confirms that the CPC design is extremely tolerant to pointing and alignment errors, minor distortions, etc. A two stage non-imaging design was shown, by preliminary measurements and analysis, to provide both the desired angular tolerance and the required degree of intensity uniformity if higher concentrations (4X-10X) are necessary.

N79-31780/6 PC **A03**/MF **A01**
Alabama Univ., University. Dept. of Physics and Astronomy.
Development of Surfaces Optically Suitable for Flat Solar Panels.
Final Report.
Aug 79, 46p NASA-CR-161290
Contract NAS8-32481
Subm-Prepared for DOE.

A reflectometer which can separately evaluate the spectral and diffuse reflectivities of surfaces is described. A phase locked detection system for the reflectometer is also described. A selective coating on aluminum potentially useful for flat plate solar collector applications is presented. The coating is composed of strongly bound copper oxide (divalent) and is formed by an etching process performed on an aluminum alloy with high copper content. Fabrication costs are expected to be small due to the one stop fabrication process. A number of conclusions gathered from the literature as to the required optical properties of flat plate solar collectors are discussed.

ORAU/IEA-79-8(R) PC **A04**/MF **A01**
Oak Ridge Associated Universities, Inc., TN. Inst. for Energy Analysis.
Shale Oil: U.S. And World Resources and Prospects for Near-Term Commercialization in the United States.
G. Marland. Mar 79, 59p
Contract EY-76-C-05-0033

Although the United States has large resources of shale oil, several decades of development effort have yet to result in a viable industry. Because both the cost of the oil and the environmental impact of its production are not well known and seem to remain perennially at the margin of acceptability, the matter of commercialization has become a political issue. A variety of economic incentives and government programs to encourage commercial development have been proposed - some implemented - and several industrial corporations are proceeding cautiously. Conflicting political, economic, and environmental views, however, continue to preclude a decisive commitment and it does not appear at this time that significant quantities of shale oil will be available in the next decade, or probably even longer. (ERA citation 04:044355)

ORAU/IEA-79-9(R) PC **A04**/MF **A01**
Institute for Energy Analysis, Oak Ridge, TN.
Characterization of Industrial Process Energy Services.
S. W. Boercker. May 79, 59p
Contract EY-76-C-05-0033

A detailed analysis of the use of energy by industry is reported. The industrial sector, defined for this study as Standard Industrial Classification (SIC) categories 20 through 39, consumes energy primarily for space conditioning, lighting, electronics, process heat, electro processes, and mechanical drive. The first three of these account for about 1% of total industrial energy used; the last three are the subject of this paper. Almost 70% of the energy consumed by industry in the present decade is used as thermal energy or process heat; thus, process heat received primary attention and has been characterized by temperatures and by transfer media. Because all the data concerning energy which were combined in this study are not for the same year, all process heat data are normalized to 1974 fuels consumed for process heat. These data are later used to characterize all industrial energy use for 1972, a characterization accomplished by assuming that the temperature spectrum in 1972 was the same as in 1974 and by evaluating the uses of electricity by industry. A preliminary investigation of the alteration in energy needs when coal replaces petroleum and natural gas as the feedstock for chemicals industries is also included. (ERA citation 04:048849)

ORNL/OEPA-8 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Potential Institutional Conflicts in the Implementation of the Resource Conservation and Recovery Act and Their Impacts on the Department of Energy: Background Information.
S. Carnes, C. Tevepaugh, G. Young, and R. C. DeVault. Feb 79, 47p
Contract W-7405-ENG-26

The Resource Conservation and Recovery Act (RCRA) of 1976 is examined with respect to its implementation by EPA and its impacts on DOE. Generic implementation problems are identified, and implementation of the act is assessed from the perspectives of Congress, the EPA, the courts, and the states. The major findings of this study are: the short-term implementation scenario (1978--1983) is likely to be dominated by state and local political processes and regulatory activities; RCRA implementation is likely to be interpreted and guided by litigation; the resource and energy recovery aspects of RCRA (Subtitle E) are being ignored relative to the hazardous waste aspects of RCRA (Subtitle C); expanded public participation under RCRA is delaying the implementation of the act and may lead to increased litigation; and the long-term implementation scenario (after 1983) is difficult to project due to present uncertainty and necessary reauthorization by Congress in 1979. 30 references. (ERA citation 04:044885)

ORO-5099-T1 PC **A08**/MF **A01**
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
Energy Conservation in the Textile Industry. Phase I.
F. L. Cook, J. E. Dawkins, D. S. Brookstein, W. C. Carter, and R. H. Fulford. 1977, 167p
Contract EY-76-S-05-5099

Energy conservation potential of each major process (batch and continuous) is estimated in this Phase I report. The approach was to gather process energy-consumption data from available literature and selected companies and to develop a production matrix by wet process within the industry. For Phase II, equipment and procedure modifications are being developed to demonstrate energy savings. (ERA citation 04:050281)

ORO-5523-T1 PC **A09**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Utilization of Waste Heat from Federal Facilities. Final Report.
Feb 79, 190p
Contract EC-77-C-05-5523

Separate studies were made for evaluating the technical and economic feasibility of using waste heat from each of four Federal facilities, the Oak Ridge Gaseous Diffusion Plant (ORGDP), Paducah Plant, Portsmouth Gaseous Diffusion Plant (PGDP), and the Savannah River Plant (SRP) for industrial process heat, space heating, power generation, or in agriculture or aquaculture. Environmental and institutional issues associated with waste heat utilization are examined. Recommended uses and the cost of implementing waste heat utilization near each site are discussed. The recommended uses at Oak Ridge include district heating, greenhouse heating, and heat pump-enhanced temperature elevation of the ORGDP waste heat for subsequent process heat use in a textile mill. At Paducah the recommendation is to use heat pumps to raise the waste heat temperature for preheating feedwater for a 1000 MW coal-fired power plant. At Portsmouth greenhouse heating is recommended. At the SRP aquacultural and greenhouse uses and utilization for power generation by means of a Rankine cycle process are recommended. (ERA citation 04:048864)

PB80-100027 PC **A11**/MF **A01**
Wyoming Univ., Laramie. Center for Urban and Regional Analysis.
Socioeconomic Longitudinal Monitoring Project. Volume I. Summary.
Final rept. Nov 75-Jun 78,
James G. Thompson, Audit L. Blevins, Jr., Gary L. Watts, Robert L. Kimble, and Dave Gaarder. Jun 79, 242p OWRC-071/1
Contract OWRC-10670156
See also Volume 2, PB80-100035.
Also available in set of 5 reports PC E13, PB80-100019.

The Longitudinal Socioeconomic Monitoring Study was conducted to compare actual socioeconomic changes which accompany the construction of coal-fired electric powerplants with those projected in impact statements. Emphasis was on collecting primary data. Three surveys were conducted: (1) a household survey; (2) a business survey; and (3) a project survey. The results are summarized in five documents. Vol. I - Summary compares socioeconomic changes in McLean Co., ND and Platte Co., WY with those predicted for each county, with each other and with changes in two nonimpacted counties; Kimball Co., NE and Wheatland Co., MT. The purpose of the analysis is to estimate types and magnitudes of socioeconomic changes which occur under the condition of large scale energy development.

PB80-100035 PC **A06**/MF **A01**
Wyoming Univ., Laramie. Center for Urban and Regional Analysis.
Socioeconomic Longitudinal Monitoring Project. Volume II. McLean County Profile.
Final rept. Nov 75-Jun 78,
James G. Thompson, Robert L. Kimble, Robert Wisniewski, Audie L. Blevins, Jr., and Jeanette Studer. Jun 79, 114p OWRC-071/2
Contract OWRC-10670156
See also Volume 1, PB80-100027 and Volume 3, PB80-100043.
Also available in set of 5 reports PC E13, PB80-100019.

The Longitudinal Socioeconomic Monitoring Study has been conducted to compare actual socioeconomic changes which accompany the construction of coal-fired electric power plants with those projected in impact statements. Volume II analyzes the socioeconomic changes in McLean County, ND which have accompanied the construction of Coal Creek Station. Of particular importance are data describing types of changes occurring in the early stages of construction and analysis of deviations from impact projections.

PB80-100043 PC **A06**/MF **A01**
Wyoming Univ., Laramie. Center for Urban and Regional Analysis.
Socioeconomic Longitudinal Monitoring Project. Volume III. Platte County Profile.
Final rept. Nov 75-Jun 78,
Robert L. Kimble, James G. Thompson, Robert Wisniewski, Audie L. Blevins, Jr., and Jeanette Studer. Jun 79, 106p OWRC-071/3
Contract OWRC-10670156
See also Volume 2, PB80-100035 and Volume 4, PB80-100050.
Also available in set of 5 reports PC E13, PB80-100019.

The Longitudinal Socioeconomic Monitoring study has been conducted to compare actual socioeconomic changes which accompany the construction of coal-fired electric power plants with those projected in impact statements. Volume III analyzes Platte County (Wyoming), a control county for Kimball County (Nebraska). To isolate socioeconomic changes due to energy development, a control county was matched with each impacted community. The socioeconomic changes occurring in a county with little population growth are summarized in this volume.

PB80-100050 PC **A04**/MF **A01**
Wyoming Univ., Laramie. Center for Urban and Regional Analysis.

Socioeconomic Longitudinal Monitoring Project. Volume IV. Wheatland County Profile.
Final rept. Nov 75-Jun 78,
Jeanette Studer, Robert Wisniewski, James G. Thompson, Robert L. Kimble, and Audie L. Blevins, Jr. Jun 79, 74p OWRC-071/4
Contract OWRC-10670156
See also Volume 3, PB80-100043 and Volume 5, PB80-100068.
Also available in set of 5 reports PC E13, PB80-100019.

The Longitudinal Socioeconomic Monitoring Study has been conducted to compare actual socioeconomic changes which accompany the construction of coal-fired electric generating plants with those proposed in impact statements. Vol. IV describes the Socio-economic changes in Wheatland County (Montana) which have accompanied construction of the Laramie River Station. Significant in this volume are the descriptions of preconstruction preparations, changes in housing and employment in the year preceding construction, and mitigation arrangements for estimated impacts.

PB80-100068 PC **A05**/MF **A01**
Wyoming Univ., Laramie. Center for Urban and Regional Analysis.
Socioeconomic Longitudinal Monitoring Project. Volume V. Kimball County Profile.
Final rept. Nov 75-Jun 78,
Jeanette Studer, Robert Wisniewski, James G. Thompson, Robert L. Kimble, and Audie L. Blevins, Jr. Jun 79, 77p OWRC-071/5
Contract OWRC-10670156
See also Volume 4, PB80-100050.
Also available in set of 5 reports PC E13, PB80-100019.

The Longitudinal Socioeconomic Monitoring Study has been conducted to compare actual socio-economic changes which accompany the construction of coal-fired electric power plants with those projected in impact statements. Volume V deals with Kimball County, a control county being matched with Platte County, WY. This volume analyzes social and economic changes in a county with little population growth.

PB80-101496 PC **A04**/MF **A01**
Minnesota Energy Agency, St. Paul.
Analysis of Engineering Audits at State-Owned Buildings in Minnesota,
Eric Hirst, Robert Tyler, Christopher Eastes, and Jess Dumagan. Sep 79, 57p MEA-10/79/2

This report describes the contents and analyzes the results of detailed engineering audits performed at 41 institutions owned by the State of Minnesota. These institutions include community colleges, state universities, office buildings, hospitals, and Dept. of Transportation regional facilities. The audits covered 270 buildings and include 2010 individual energy conservation recommendations.

PB80-102031 PC **A03**/MF **A01**
Illinois Dept. of Business and Economic Development, Springfield. Office of Research.
Illinois Energy Consumption 1963-1977,
Lynn Hill, and Wallace Biermann. Jun 79, 40p
Sponsored in part by Illinois Inst. of Natural Resources, Springfield. See also PB-271 748.

This report contains current and historical Illinois energy consumption data by consuming sector and fuel type. It also contains detailed description of mapping techniques used in developing the data.

RAND/R-2481-DOE PC **A05**/MF **A01**
RAND Corp., Santa Monica, CA.
Review of Cost Estimation in New Technologies: Implications for Energy Process Plants.
E. W. Merrow, S. W. Chapel, and C. Worthing. Jul 79, 125p
Contract EX-76-C-01-2337

Estimates of capital costs of pioneer energy process plants have been poor predictors of actual capital costs. Pre-design and early design estimates (even in constant dollars) have routinely understated definitive design estimates or ultimate costs by more than 100% for oil shale, coal gasification and liquefaction, tar sands, solid waste, and nuclear fuel reprocessing plants. This phenomenon of cost growth creates significant planning and management problems for both industry and the Department of Energy. For industry, cost growth has led to canceled plans, wasted costly design efforts, and in some cases significant losses when premature capital commitments have been made. For government energy officials, cost growth has made R and D allocation decisions difficult, has increased the uncertainty in supply planning, and has hampered commercialization planning efforts. This report reviews literature on cost estimation in several areas involving major capital expenditure programs: energy process plants, major weapons systems acquisition, public works and large construction projects, and cost-estimating techniques and problems for chemical process plants. One of the goals of this review was to aid in the development of a conceptual framework for the study. (ERA citation 04:048747)

SAN-1846-T2 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
California Solar Data Manual.
P. Berdahl, D. Grether, M. Martin, and M. Wahlig. Mar 78, 6p
Contract ET-78-C-03-1846

This solar data manual is aimed at the needs of designers, architects, engineers, homeowners, builders, and the growing number of ingenious and enthusiastic individuals through whose efforts the widespread use of the sun's energy will become a reality. Because it contains the most reliable solar data presently available in the State of California, this manual provides the basic solar data needed to design residential or commercial heating systems, solar heated swimming pools, and solar air conditioning systems. Many other uses of the data are possible - for example, for agricultural applications. The data are provided in a variety of representations as an attempt to make them accessible and useful to the broadest possible audience. This manual is not intended to show how to design a solar heaing system for a home, or tell how many square meters of solar collector area are needed to heat a swimming pool. (ERA citation 04:046056)

SAND-78-1315(Rev.) PC **A14**/MF **A01**
Sandia Labs., Albuquerque, NM.
User's Manual for Computer Code SOLTES-1 (Simulator of Large Thermal Energy Systems).
M. E. Fewell, and N. R. Grandjean. Jun 79, 318p
Contract EY-76-C-04-0789

SOLTES simulates the steady-state response of thermal energy systems to time-varying data such as weather and loads. Thermal energy system models of individual components and simple and complex systems can easily be modularly constructed from a library of routines. These routines mathematically model solar collectors, pumps, switches, thermal energy storage, thermal boilers, auxiliary boilers, heat exchangers, extraction turbines, extraction turbine/generators, condensers, regenerative heaters, air conditioners, process vapor, etc; SOLTES also allows user-supplied routines. Fluid names need only be specified in order to instruct SOLTES to obtain the proper constants from a fluid property data blank. Load management allows SOLTES to simulate total energy systems that simultaneously follow process heat and power loads and demands. Power, heating, and/or cooling requirements of each component in the system model can be satisfied by other components in the system or externally. Cooling, heating, electrical, mechanical, thermal, and/or hot-water loads may be read from a data file, combined by category, scaled and/or peak-shaved, and followed. Hourly weather data for typical meteorological years for 26 locations in the US are used, or the user can supply weather data with any time increment. Generalized energy accounting is available and instantaneous and integrated values for system performance parameters may be automatically determined. In addition to other data, system performance and energy accounting parameters may be written to a file for access by user-supplied programs for economic, rate, or auxiliary supply analyses, etc. Because of its modularity and flexibility, SOLTES can be used to simulate a wide variety of thermal energy systems such as solar power/total energy, fossil-fired power plants/total energy, nuclear-fired power plants/total energy, solar energy heating and cooling, geothermal energy, and solar hot water. (ERA citation 04:048315)

SAND-78-2183 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Compendium of Solar-Thermal Collector Procurement Activities at Sandia Laboratories.
D. E. Randall. May 79, 36p
Contract EY-76-C-04-0789

This report provides a single compendium of information about three major solar thermal collector procurement cycles and two special sole-source procurements undertaken by Sandia Laboratories. A summary of the experience and lessons learned from these activities is included. (ERA citation 04:048459)

SAND-79-0346 PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Assessment of the Relative Benefits of Solar Energy Systems for Application to a Mixed-Load Community.
R. R. Peters. Jun 79, 18p
Contract EY-76-C-04-0789

The results of an investigation of the relative benefits of both present-day and advanced technology solar energy systems are presented. Solar Total Energy (STE) systems, Small Power (SP) systems, and Solar Process Heat (SPH) systems designed for a mixed-load community are considered. The methodology used in sizing these systems is discussed and the before-tax benefit-to-cost ratio of these systems is used to evaluate their relative merits for two different energy inflation rate scenarios. The results indicate that both present-day and advanced technology STE systems are more economical than their SP system counterparts because they are able to sell a much larger fraction of the total energy collected by their collector fields. Since they also produce electricity (which is presently more valuable than thermal energy) with approximately the same size fields as their SPH counterparts, STE systems are more economical than SPH systems. (ERA citation 04:049621)

SAND-79-8655 PC **A03**/MF **A01**
Sandia Labs., Livermore, CA.
Research Efforts in Eight Industrial Countries to Increase the Use of Coal.
J. H. Pohl, and D. R. Hardesty. Jun 79, 38p
CONF-791001-1
Contract EY-76-C-04-0789
United Nations symposium on world coal production, Katowice, Poland, Oct 1979.

During 1977 and 1978 we visited with, discussed coal research with, and reviewed the technical literature of coal research institutes in eight countries, Australia, Federal Republic of Germany, France, Netherlands, New Zealand, Polish People's Republic, United Kingdom, and the United States. We were able to visit utility companies, boiler manufacturers, private research laboratories, government research laboratories, and universities in these countries. Coal is the only fuel other than nuclear power that can satisfy the short term energy needs of the world. Coal resources are adequate to fulfill these energy needs. In the future, as now, most of the coal used will be burned as pulverized coal in large industrial and utility boilers. However, two major problems must be addressed before use of coal can drastically increase. First pollutant emissions from coal-fired boilers must be controlled at levels acceptable to the populace and at costs acceptable to the utility operators. Second, improving the precision with which boilers are designed and the availability of the boiler during operation can improve the competitivity advantage of coal over other fuels. When these problems have been solved, world coal use should increase in proportion to coal resources. (ERA citation 04:049430)

SERI/RR-34-152 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
SERAPH Implementation Plans.
J. Castle, W. Su, D. A. Dougherty, and J. D. Wright. May 79, 45p
Contract EG-77-C-01-4042

The Solar Energy Research Institute (SERI) devotes a significant research effort to the application of solar technology in the industrial sector. It is well known that US industries consume a significant amount of energy, a large portion of which is required in a temperature range in which concen-

trating solar collectors work effectively. The SERAPH facility (Solar Energy Research and Applications in Process Heat) will provide at SERI the capability of addressing many of the technical issues that currently hamper industrial solar thermal energy system implementation. The primary building blocks of SERAPH are the solar delivery subsystem, control, and data acquisition subsystem (including sequencing and emergency supervision), energy distribution subsystem and two physical areas set aside for storage development and the introduction of load devices. Emphasis has been placed on creating a versatile test facility within which the solar industry can work with SERI in the development of solar systems that will be attractive to potential industrial users. SERAPH will have an initial capability of producing steam at a rate of 900 lb/h (410 kg/h) which corresponds to an energy delivery rate of 1.5 million Btu/h (1.6 x 10 exp 6 kJ/h) at 430 exp 0 F (220 exp 0 C) with expansion capability to approximately 600 exp 0 F (315 exp 0 C). The initial system controls will be analog with supervisory and direct digital control to follow. The issues to be addressed at SERAPH will be computer predictive model validation and refinement, control strategy development, solar equipment evaluation, and the accumulation of operating and maintenance experience. A consistent theme throughout the planning and operation of SERAPH is the need to develop and follow practices that are consistent with conventional industrial operating procedures. (ERA citation 04:048441)

SERI/TP-31-193 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Long-Term Glazing Performance.
G. J. Jorgensen. 1979, 12p CONF-790667-1
Contract EG-77-C-01-4042
Solar glazing: 1979 topical conference, Pomona, NJ, USA, 22 Jun 1979, Portions of document are illegible.

A survey of glazing materials is presented and initial (nondegraded) properties are compared. Weathering characteristics are discussed in terms of mechanisms and their effects upon candidate glazings. Examples of failure modes are given for various commercially available materials. A specific process, optical degradation, was studied in detail to determine how loss of solar transmission affects the thermal performance of flat-plate solar energy collection systems. Computer simulations of singly and doubly glazed collectors having cover plates of various commercially available transparent materials were made for one-week time periods using Phoenix, Ariz., insolation and meteorological data. Optical degradation was modeled by systematically decreasing the specified values of solar transmittances of the plastic cover plates under consideration. Energy collection efficiencies corresponding to each decrement of transmittance were normalized to that of nondegraded glass to allow comparisons both with a standard and among the different plastics. This provides a measure of the relative usefulness of various candidate polymeric glazing materials when realistic rates of optical degradation are known. (ERA citation 04:049775)

SERI/TR-51-163 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Implementation of State Solar Incentives: Land-Use Planning to Ensure Solar Access.
P. Pollock. Mar 79, 43p
Contract EG-77-C-01-4042

State incentives in land-use planning to ensure solar access are examined to determine issues in program design and implementation. Available incentives are reviewed to indicate their structure and purpose. These incentives include broad legislative grants of solar rights, application of nuisance law to solar-collector shading, removal of restrictive covenants or establishment of covenants to protect solar access, provision for privately-negotiated solar easements, and land-use planning and regulation to include passive solar design and provision for active solar collection in land-use development. State initiatives in the period 1973 to 1978 are cataloged. Case studies in four states (Oregon, California, New Mexico, and Minnesota) are reported. Oregon is currently engaged in a statewide, mandated local comprehensive planning process which includes consideration of energy conservation and renewable energy sources. California has recently adopted two solar access related bills which address private solar easements, subdivision design, restrictive covenants, and shading by vegetation. New Mexico has established a broad legislative grant of solar rights based on water rights law. And Minnesota has authorized the inclusion of solar energy as a factor in local land use planning and established a private easement procedure. (ERA citation 04:046837)

SERI/TR-62-241 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Wind Energy: Legal Issues and Institutional Barriers.
L. Coit. Jun 79, 31p
Contract EG-77-C-01-4042

Before the potential of wind energy can be realized, large-scale commercialization will have to occur. Standing in the way of commercial development are various institutional and legal barriers. These include (1) possible conflicts with existing zoning and other land-use planning schemes, (2) the question of guaranteeing access to the wind, (3) possible tort and environmental law issues raised by WECS operation, and (4) the critical problem of creating financial incentives. The implications of each of these issues and solutions where practicable are presented. (ERA citation 04:046337)

SIB-R-47-1978 PC **A07**/MF **A01**
National Swedish Inst. for Building Research, Stockholm.
Fourteen Villas with Low Energy Consumptions at Umeaa, Sweden, Studied During the Period of Construction.
J. A. Jonson. 1978, 143p
In Swedish.
U.S. Sales Only.

Fourteen identical houses with low energy consumption were built at Umeaa, Sweden, by seven different companies. The aim was that the house producers develop and build houses of such a type which could be used in their ordinary production. Already tested methods should be applied in order to save energy. The practical experiences from this project are summarized. (ERA citation 04:048829)

STU-78-3393 PC **A05**/MF **A01**
Styrelsen foer Teknisk Utveckling, Stockholm (Sweden).
Utilization of Energy at Ironworks, Steelworks and Metal Works: A Summary of a Field Investigation at Works in the Northern Countries.
J. Fors, R. Hardell, and B. Nord. Nov 78, 99p
In Swedish.
U.S. Sales Only.

Ironworks, steelworks and metalworks in the Northern countries were investigated. Five questions were discussed: the energy supply at the works; conventional techniques for energy management; the need for prototype and demonstration plants; suggestions for future research and development projects; and energy losses in flue gases from rolling-mill furnaces. (ERA citation 04:048848)

TID-28820 PC **A07**/MF **A01**
AIA Research Corp., Washington, DC.
Base Data for the Development of Energy Performance Standards for New Buildings. Phase One, Task Report: Building Classification, January 12, 1978.
Oct 78, 129p
Contract EX-76-A-29-1020

This research develops a system for the classification of building types suitable for the collection of designed energy-performance data and the implementation of national energy performance standards for new construction. A General Classification Scheme for building types was derived primarily from the occupancy descriptions in standard building codes, to assure compatibility with classifications currently accepted in the construction review process. A Classification System for Data Collection was condensed from the General Classification Scheme. This system includes four levels of description: building category, building type, plan type, and space use. (ERA citation 04:044968)

TID-28822 PC **A06**/MF **A01**
AIA Research Corp., Washington, DC.
Base Data for the Development of Energy Performance Standards for New Buildings. Phase One, Task Report: Sample Design, January 30, 1978.
Oct 78, 108p
Contract EX-76-A-29-1020

This report provides documentation of the sample design used to conduct the survey for Phase I of the HUD Baseline Building Study. It covers: (1) the various considerations that were involved in the choice of the details of the sample design used; (2) the details of the sample selection and control; (3) the details of computation procedures for estimates and confidence intervals of the estimates; and (4) an evaluation of the sampling variability actually achieved. (ERA citation 04:044969)

TID-28823 PC **A03**/MF **A01**
AIA Research Corp., Washington, DC.
Base Data for the Development of Energy Performance Standards for New Buildings. Phase One, Task Report: Data Collection, January 12, 1978.
Oct 78, 49p
Contract EX-76-A-29-1020

This task collected data for estimating the designed energy performance of a random selection of recent residential and non-residential buildings, as part of the first phase in the development of energy-performance standards for new construction. A building survey was conducted with extensive field support to monitor the completion of survey forms and ensure sample control. Buildings and their designers were identified through Dodge Construction Reports. Each building selected for the sample was assigned to a regional team of field representatives, who monitored and assisted in the completion of the survey forms. Weather data were obtained from the National Oceanographic and Atmospheric Administration for each of the building locations for use in estimating the designed energy performance of each sample building. (ERA citation 04:044970)

TID-28825 PC **A06**/MF **A01**
AIA Research Corp., Washington, DC.
Base Data for the Development of Energy Performance Standards for New Buildings. Phase One, Task Report: Residential Data Collection and Analysis, January 12, 1978.
Oct 78, 117p
Contract EX-76-A-29-1020

This report presents residential data collection and analysis undertaken for the U.S. HUD. The NAHB Research Foundation has developed base data on the designed energy performance of low-rise residential construction, including single family detached and single family attached homes, multifamily low-rise dwellings, and mobile homes in various climatic regions across the continental U.S. Data on energy-related building characteristics collected in a recent survey of single-family houses and low-rise multi-family residential construction in the last half of 1975 and the first half of 1976 were used for the residential analysis. A similar survey was conducted to document the production and energy-related construction characteristics of mobile homes. The data collected represents approximately 125,000 single-family homes, 45,000 multi-family low-rise units, and 175,000 mobile homes. Weather data were also compiled for each location where building data were collected. The technique used to estimate energy performance from the residential data was essentially a manual steady-state heat-transfer method which was computerized to reduce the processing time required for the large number of buildings. The annual energy performance of each building was estimated using building design data, heat loss and heat gain multipliers, and heating and cooling utilization factors. (ERA citation 04:044985)

TID-28855(Dr) PC **A05**/MF **A01**
Department of Energy, Washington, DC.
Commercialization Strategy Report for Conservation Product Marketing.
M. Chiogioji, A. W. Feldt, A. J. Hayes, J. W. Osbourne, and P. J. Reynolds. 89p

Three strategy reports are included in this publication. The discussion on market demonstration of

energy-saving options for residential, oil-fired heating equipment indicates appreciable oil could be realized if residential furnaces were retrofitted with fuel-saving devices, i.e., optimizing the firing rate of furnaces; installing flame-retention head burners; and installing efficient boilers/furnaces. A strategy report for air/fuel ratio combustion control is included. The application of low excess air firing to industrial combustion equipment holds the potential for both reducing fuel consumption and the emission of NO/sub x/ and SO sub 3 . LEA firing can only be accomplished through a series of systematic and complex manual procedures involving boiler inspections, test, and adjustments to improve boiler operating efficiency and minimize air pollution. The third strategy report is given for high-efficiency electric motors. Improved efficiency and power factor correction is achievable with new and existing motors. Some fractional-hp motors have been shown to increase efficiency and power factor significantly by incorporating the Wanlass retrofit method, which optimizes the start-run capacitors to maximize motor efficiency at its operating load. Improved efficiency in new motors is attainable through reducing power losses, core modifications, and reducing stray load losses, and correcting friction and windage losses. Power-factor correction which conserves energy input to the motor may be also accomplished by attaching a capacitor to the motor. Part I in the strategy reports is the Concept Statement; Part II, the commercialization readiness assessment; and Part III, the commercialization strategy. (ERA citation 04:046885)

TREE-1365 PC **A06**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Analysis of Binary Thermodynamic Cycles for a Moderately Low-Temperature Geothermal Resource.
O. J. Demuth. Jul 79, 105p
Contract EY-76-C-07-1570

Analyses of a number of geothermal binary-cycles were made with the objective of finding a cycle which can produce low-cost electrical energy from a moderately low-temperature geothermal resource. Cycles were screened which included isobutane, pentane, cis-2-butene, and several mixed-hydrocarbon working fluids. Dual- and triple-boiling cycles were analyzed. Both shell-and-tube and direct-contact boilers, heaters, and condensers were assessed. A geothermal fluid (geo-fluid), typical of Raft River resource conditions was assumed, which has a temperature of 290 exp 0 F and 52 parts per million dissolved nitrogen. Special emphasis in the analyses was directed toward investigation of several methods for keeping the loss of working fluid for the cycle at an acceptable level. It was concluded that for the Raft River geo-fluid, the direct-contact cycle has a potential for net geo-fluid utilization effectiveness values, (watt-hr/lbm geo-fluid) equivalent to those of the shell-and-tube cycle. Therefore, because of the lower cost of direct-contact components, a potential exists for the direct-contact plant to produce lower cost electrical energy than a comparable shell-and-tube plant. Advanced cycles were assessed which showed improvements in net geo-fluid utilization effectivness, relative to the first Raft River 5-MW Pilot Plant (dual-boiling, shell-and-tube isobutane cycle), of up to 19%. (ERA citation 04:049828)

UCRL-15004 PC **A02**/MF **A01**
California Univ., Berkeley. Center for Research in Management Science.
Political Economy of Energy Regulation: A Classification of Policies.
F. E. Balderston. Jun 78, 20p
Contract W-7405-ENG-48

Advocates of free markets for energy supplies argue that we do not need to have energy policies. A smoothly operating competitive price system is desirable, but there are three traditional arguments against full reliance on free pricing for some types of energy: some energy production and distribution is held to require the conditions of natural monopoly in its technology and scale requirements, thus forcing either public price regulation or nationalized productions and distribution; fuel production and burning are often a dirty business, producing pollutants as unwanted by-products or negative externalities and thus requiring that public interventions take place to offset the failure of the market to reflect adequately these social costs;and energy markets may fail to deal adequately with the future, and they may also give misleading signals about the important politics of energy, worldwide. The traditional reasons for energy regulation have come under sophisticated recent attack by liberal economists, who argue that greater economic efficiency would be achieved if some activities in the energy sequence were deregulated. Various domains of possible energy policies are identified in this discussion and 11 criteria of good public policy are defined. Examples of an energy policy consistent with each criterion are given. (ERA citation 04:044915)

UCRL-52672 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Lawrence Livermore Laboratory Energy Policy Model: A Brief Overview.
C. J. Anderson. 6 Mar 79, 12p
Contract W-7405-ENG-48

A computer language and model, used to calculate potential patterns of energy production and pricing in the United States, has recently been developed at the Lawrence Livermore Laboratory (LLL). This computer tool is unique in two major respects: (a) it can handle nonequilibrium effects (such as government regulations) within the framework of a general equilibrium network model (i.e., a model of a free-market economy); (b) it is structured in terms of a new symbolic language that greatly facilitates building and experimenting with large models. This report gives a brief overview of the model and language, and provides references to the complete documentation. (ERA citation 04:050150)

10B. Power Sources

AD-A073 884/9 PC **A02**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Ion-Implanted Laser-Annealed GaAs Solar Cells.
Journal article,
John C. C. Fan, Joseph P. Donnelly, Carl O. Bozler, Ralph L. Chapman, and George W. Turner. 15 Jan 79, 4p JA-4920, ESD-TR-79-176
Contract F19628-78-C-0002
Pub. in Applied Physics Letters, v34 n11 p780-782, 1 Jun 79.

No abstract available.

ANL/MHD-79-10 PC **A03**/MF **A01**
Argonne National Lab., IL.
GPSAP: General Purpose Systems Analysis Preprocessor.
H. K. Geyer, and R. A. Sacks. May 79, 46p
Contract W-31-109-ENG-38

GPSAP is designed to allow users with little computer experience to carry out complex numerical systems analysis studies quickly and easily. Given a set of precompiled subroutines modeling the behavior of the components and a brief structure describing the way in which these components are linked and/or constrained, the preprocessor constructs a main program to carry out the analysis. The use of a preprocessor approach, coupled with symbolic code words for the standard system-analytic procedures (e.g., vary model parameters, perform parameter sweeps, study sensitivity or constrained optimization, store or retrieve data from file memory), yields great flexibility while maintaining simplicity in both the GPSAP code itself and the input structures used to invoke it. The code was developed over a period of time for the analysis of various types of problems in MHD channel design. (ERA citation 04:050258)

ANL/MHD-79-4 PC **A05**/MF **A01**
Argonne National Lab., IL.
Technical Support for Open-Cycle MHD Program. Progress Report, July–December 1978.
E. D. Doss. Jun 79, 87p
Contract W-31-109-ENG-38

The support program for open-cycle MHD at Argonne National Laboratory is developing the analytical tools needed to investigate the performance of the major components in the combined cycle MHD/steam power system. The analytical effort is centered on the primary components of the system that are unique to MHD and also on the integration of these analytical representations into a model of the entire power producing system. The present project activities include modeling of the combustor, MHD channel, slag separator, and high-temperature air heater. In addition, these models are combined into a complete system model, which is at present capable of carrying out optimizations of the entire system relative to either thermodynamic efficiency or cost of electrical power. Also, in support of other aspects of the open-cycle program, test plans are developed and facility and program reviews are provided upon request in support of the needs and requirements of the DOE/MHD Division. (ERA citation 04:050252)

ANL/MHD-79-8 PC **A03**/MF **A01**
Argonne National Lab., IL.
MHD Heat and Seed Recovery Technology Project. Fifth Quarterly Report, January–March 1979.
M. Petrick, K. E. Tempelmeyer, and T. R. Johnson. May 79, 42p
Contract W-31-109-ENG-38

The MHD Heat and Seed Recovery Technology Project at Argonne National Laboratory is obtaining information pertinent to the design and operation of the heat and seed recovery systems downstream of the channel-diffuser and to the seed regeneration processes. The project goal is to supply the engineering data required in the design of components for prototype and demonstration MHD facilities. The present project activities include: (1) assistance to and cooperation with other MHD programs including the Heat Recovery-Seed Recovery facility; (2) studies of the thermochemistry of seed-slag systems; (3) investigations of ceramic and metallic materials for service in the downstream gas systems; (4) small-scale engineering studies of seed-slag deposition; (5) operation of a 2-MW experimental facility for investigations pertaining to the downstream gas system; and (6) evaluation of seed regeneration processes. (ERA citation 04:050257)

ANL/OTEC-BCM-003 PC **A03**/MF **A01**
Argonne National Lab., IL.
Qualification of Aluminum for OTEC Heat Exchangers.
F. L. LaQue. May 79, 32p
Contract W-31-109-ENG-38

The basis for qualification of aluminum as a material for use as tubing in Ocean Thermal Energy Conversion heat exchangers is reviewed. Reference is made to compendia of data from tests of aluminum alloys in natural sea water and to applicable service records. Data from these sources were found to be inadequate to either qualify or disqualify aluminum. They serve only to identify the 5052 alloy and Alclad 3003 or 3004 as being worthy of additional testing under conditions more directly related to what will be encountered in OTEC heat exchangers. The principal deficiency of data from long-time tests in natural sea water is that in almost all of these tests the specimens were exposed under static conditions that caused the surfaces to be covered by marine fouling organisms that would not be present in heat exchanger tubes. The tests did not take into account possible effects of periodic mechanical or chemical treatments to remove fouling or chemical treatments (chlorination) to prevent fouling. A current testing program sponsored by the Department of Energy through Argonne National Laboratory is designed to provide the needed data. Limited tests in high velocity sea water have indicated that aluminum tubes would tolerate the velocities under 10 ft (3 m) per second likely to be used in OTEC heat exchangers. (ERA citation 04:048323)

ANL/OTEC-BCM-004 PC **A06**/MF **A01**
Dow Chemical U.S.A., Freeport, TX. Texas Div.
Study of the Corrosive Effect on Aluminum and CP Titanium of Mixtures of Ammonia and Seawater That May Be Encountered in OTEC Heat Exchangers. Final Report.
C. F. Schrieber, W. D. Grimes, and W. F. Mcilhenny. Mar 79, 121p
Contract W-31-109-ENG-38

The design currently most favored for an Offshore Thermal Energy Conversion power plant would

use an ammonia cycle energy system as powered by the small thermal differences existing between warm surface and deep ocean waters. A possibility therefore exists for ammonia or seawater leakage within the evaporator or condenser. The objective of this work is to assess the extent to which small concentrations of seawater would affect corrosion of aluminum and CP titanium by ammonia and the extent to which small concentrations of ammonia might affect the same alloys by seawater. Testing was conducted using coupons of aluminum alloys 3003-H14, 5052-H32, and 5086-H32, CP titanium, and aluminum alloy 5052-H32 as pretreated for 8 hours in boiling deionized water. Four pilot units were constructed to investigate different possible OTEC heat exchanger environments. Experimentation on ammonia leakage into seawater employed two units containing recirculating (approx. 6 gal.), temperature-controlled (5 exp 0 C or 30 exp 0 C) seawater at 5.6 and 2.5 fps with continuous seawater refreshment (2.0-0.5 gpm). Ammonia leakage was simulated in these two units by injection of ammonia hydroxide into the refreshment seawater. A third unit with the same seawater supply utilized seawater on a once-through, 5 fps, ambient temperature basis to simulate optimum, no-leak OTEC seawater service. Performance of the subject alloys in ammonia and ammonia containing seawater utilized recirculating ammonia with temperature controlled to 5 exp 0 C. The experimental procedure and test results are discussed. (ERA citation 04:048324)

ANL/OTEC-BCM-005 PC **A03**/MF **A01**
Ichthyological Associates, Inc., Absecon, NJ.
Review of Water Intake Screening Options for Coastal Water Users with Recommendations for Ocean Thermal Energy Conversion (OTEC) Plants.
D. L. Thomas. May 79, 43p
Contract W-31-109-ENG-38

The large volumes of water withdrawn at both the warm and cold water intakes of an OTEC plant must be screened to remove organisms and debris which could clog the heat exchangers. The recent literature on screening technology is reviewed. In addition, various screen manufacturers and coastal facilities which use large volumes of seawater were visited to determine the operating experience with present screen technology. Static screens (particularly the Johnson Division, UOP profile wire screen and the Royce Equipment Company carrousel screen) have the potential advantage for OTEC for operating in a completely submerged state and of being cheaper to operate and maintain than traveling screens. However, there is no operational history with these static screens for large intake systems. The most promising traveling screen options for OTEC are the dual flow screens. They offer more screening surface and less head loss than through flow screens of similar size. They also have been operated in seawater for large intake systems. More detailed designs of potential OTEC plants, particularly screen wells, conduit and surge tank construction and head losses need to be determined before the best alternative intake screen can be selected. 38 references. (ERA citation 04:048325)

ANL-78-95 PC **A03**/MF **A01**
Argonne National Lab., IL.
Advanced Fuel Cell Development. Progress Report, July--September 1978.
P. A. Finn, K. Kinoshita, G. H. Kucera, R. D. Pierce, and J. W. Sim. May 79, 37p
Contract W-31-109-ENG-38

This report describes advanced fuel cell research and development activities at Argonne National Laboratory (ANL) during the period July--September 1978. These efforts have been directed toward understanding and improving the components of molten-carbonate-electrolyte fuel cells operated at temperatures near 925 K. The primary focus of this work has been the development of electrolyte structures that have good electrolyte retention and mechanical properties as well as long term stability, and on developing methods of synthesis amenable to mass production. The characterization of these structures and their stability is an integral part of this effort. Synthesis studies have concentrated on the use of low-cost starting material to synthesize gamma -LiAlO sub 2 , the most stable allotrope of LiAlO sub 2 for the fuel cell conditions. Thermal stability and thermomechanical tests were performed on electrolyte mixtures to determine the effect of cell operating conditions on electrolyte tile longevity. A square cell (10.6 cm) with an electrolyte tile containing gamma -LiAlO sub 2 was tested. This tile was reinforced by a wire screen. Post-test examination of this cell after 1000 h of operation showed that the reinforced tile was considerably stronger than un-reinforced tiles. Future cells will utilize tiles with metal screen reinforcement. (ERA citation 04:050263)

ANL-79-28 PC **A02**/MF **A01**
Argonne National Lab., IL.
Advanced Fuel Cell Development. Progress Report for October--December 1978.
P. A. Finn, K. Kinoshita, G. H. Kucera, J. W. Sim, and R. D. Pierce. Jun 79, 23p
Contract W-31-109-ENG-38

Advanced fuel cell research activities at Argonne National laboratory during the period of October--December 1978 are described. These efforts have been directed toward understanding and improving the components of molten--carbonate--electrolyte fuel cells operated at temperatures near 925 exp 0 K. The primary focus of this work has been the development of electrolyte structures that have good electrolyte retention and mechanical properties as well as long-term stability, and on developing methods of synthesis amendable to mass production. The characterization of these structures and their stability is an integral part of this effort. Current electrolyte structures are comprised of LiAlO sub 2 particles and an eutectic of Li sub 2 CO sub 3 and K sub 2 CO sub 3 . The development of procedures for synthesizing LiAlO sub 2 from low cost materials is being pursued. The thermal stability of cold-pressed pellets of LiAlO sub 2 and carbonate eutectic has been tested at 925 exp 0 K for 22 to 2400 h in air, CO sub 2 , and H sub 2 --CO sub 2 --H sub 2 O. In general, under these test conditions the allotropic form of the LiAlO sub 2 particles remained stable, but their surface area decreased with time of heat treatment. Thermomechanical tests indicated that the strength of LiAlO sub 2 pellets increases with increased particle surface area. Several small (94 cm exp 2) cells have been operated in which the electrolyte tiles contained alkali carbonates and LiAlO sub 2 , primarily the gamma allotrope. The performance of these cells was improved by using a high carbonate content (69 vol %) in the tiles and the mechanical strength of the tiles was improved by the use of a metal screen. (ERA citation 04:050264)

BMFT-FBT-79-04 PC **A07**/MF **A01**
Dornier-System G.m.b.H., Friedrichshafen (Germany, F.R.).
Development of a 5,5 M Diameter Vertical Axis Wind Turbine (Phase II).
G. Binder, A. Fritzsche, A. Vollan, A. Dekitsch, and R. Joos. Jun 78, 142p
In German.
U.S. Sales Only.

In continuation of the preceding project, Development of a Vertical-Axis Wind Turbine (Phase I), the design work was performed including the aerodynamic and structural dynamic investigations. The wind energy converter has been built and tested in a wind tunnel. The rotor diameter of 5.5 m is not only a suitable size for the aerodynamic tests, but guarantees also that the results of subsequent field tests will contribute to the experimental data required for the design of larger converters. The layout of the rotor, the construction methods and the choice of materials promise favourable economic conditions for a series production applying advanced mass production technology, without excluding the manufacture in developing countries. The wind tunnel tests, performed with the 2-, 3- and 4-blade version of the Darrieus-rotor and with Savonius-rotors of different heights confirmed experimentally the aerodynamic calculations and provided further know-how referring to influences not accessible to calculation. (ERA citation 04:048510)

BNL-50924 PC **A04**/MF **A01**
Brookhaven National Lab., Upton, NY.
Hydrogen--Halogen Energy Storage System. Annual Report, January--December 1977.
J. McBreen, S. Srinivasan, F. J. Salzano, and A. H. Beaufrere. Sep 78, 60p
Contract EY-76-C-02-0016

Work at Brookhaven National Laboratory on the electrochemically regenerative hydrogen--chlorine energy storage system has included electrochemical investigations, materials studies, and technoeconomic assessment. Electrochemical studies have confirmed the reversibility of the cell reactions and the possibility of using the same cell in the electrolysis and fuel cell mode. The hydrogen--chlorine cell differs from most batteries in that the open circuit potential varies appreciably with temperature and depth of discharge. The temperature variation of the open circuit potential reflects the large negative entropy of formation of HCl. A detailed heat and mass balance analysis has been carried out for the H sub 2 /Cl sub 2 system for one method of reactant storage and two schemes of heat exchange between the hydrochloric acid storage subsystem and the reactant storage subsystems. Characterization of Nafion membranes in H sub 2 /Cl sub 2 cells is reported. From a cost comparison on a 20 MW/200 MWh electrochemically regenerative hydrogen--halogen system it was concluded that the use of either clorine or bromine or alternative methods of chlorine storage had an insignificant effect on the overall cost of the system. The most cost effective method of hydrogen storage is very dependent on the cost of activated metal hydrides. (ERA citation 04:050143)

CONF-7809137-1 PC **A02**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Fuel Cell Option.
K. F. Blurton. Oct 78, 13p
Contract EM-78-C-03-1735
Conference on national energy economics II, Tulsa, OK, USA, 18 Sep 1978.

A broad-based view of fuel cell technology and its potential application is given, and it is shown how the strategy of fuel cell development is aimed at broadening its full options. (ERA citation 04:046864)

CONF-7810130-2 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Composition Gradients Induced by Current Flow in Li sub 2 CO sub 3 --K Sub 2 CO sub 3 Mixtures.
J. Braunstein, H. R. Bronstein, S. Cantor, D. E. Heatherly, and J. I. Padova. 1978, 8p
Contract W-7405-ENG-26
The molten carbonate fuel cell workshop, Oak Ridge, TN, USA, 31 Oct 1978.

In a molten carbonate fuel cell current flow can cause gradients in the Li/K ratio of a LiKCO sub 3 electrolyte if the cation mobilities are, as in most binary molten salt mixtures, unequal. A one dimensional model predicts 10 to 20 percent composition gradients from estimated values of mobility, activity and diffusivity, none of which is well known. Predictions from a similar model for a system of known properties have been confirmed experimentally by electrolysis--relaxation experiments. The model calculations for carbonates appear consistent with electrolysis--relaxation measurements on fuel cell tiles, but clearly indicate the need for additional specific physical property data, especially the transference number. (ERA citation 04:050265)

CONF-790213-4 PC **A02**/MF **A01**
Institute of Gas Technology, Chicago, IL.
Commercial Applications of Molten Carbonate Fuel Cell Systems.
K. F. Blurton, and J. R. Peterson. 1979, 15p
Contract EM-78-C-03-1735
Energy technology conference and exposition, Washington, DC, USA, 26 Feb 1979.

The potential applications of molten carbonate fuel cells are discussed with particular emphasis on the configuration of a dispersed, oil-fueled and a central, coal-fueled base-load power plant. The penetration of these power plants into the utility generation system is described. The status of this technology is reviewed, and the major technology areas currently under investigation are discussed. (ERA citation 04:050261)

CONF-790493-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.

Analysis of Industry/Utility Shared Cogeneration Benefits.
R. W. Barnes. 1979, 9p
Contract W-7405-ENG-26
Electric Power Research Institute cogeneration workshop, San Antonio, TX, USA, 1 Apr 1979.

The attractiveness of cogeneration to a potential industrial user is influenced by several factors such as steam and electricity load dynamics, criticality of certain loads, size of energy load, personnel requirements, and reliability. Similarly, these same factors plus others, such as the effect on base load demand or scheduling power availability/demand are of concern to a utility in considering cogeneration alternatives. This paper examines various ways in which industrial plants and utilities have interacted to develop mutually beneficial cogeneration systems. (ERA citation 04:048862)

CONF-790737-1 PC **A02**/MF **A01**
Atomic Industrial Forum, Inc., Washington, DC.
Creation of an Industry Information Resource to Catalogue Power Plant Cooling System Impacts and Mitigation Measures Affecting Aquatic and Terrestrial Ecosystems.
E. H. Hannon, L. J. D'Angelo, and S. Talmage. 1979, 5p
Contract W-7405-ENG-26
Mitigation symposium, Ft Collins, CO, USA, 17 Jul 1979.

The data base design and scope, as well as the products and services offered, for the Cooling Systems Effects Data Base are summarized. (ERA citation 04:049854)

COO-2893-7 PC **A03**/MF **A01**
Illinois Univ. at Urbana-Champaign.
Energy Conservation Through Industrial Cogeneration. Final Report.
J. Joyce. Aug 78, 27p
Contract EY-76-S-02-2893

Industrial cogeneration is a method by which manufacturers can generate electricity on site, using the energy which cannot be converted into electricity for heating. A summary of the findings of previous studies on cogeneration is given. Several questions remain unanswered by these studies. One factor that has been neglected until now is the amount of energy required to produce cogeneration equipment. Calculations, therefore, are presented on the estimated energy payback time for various-sized cogeneration plants. This payback time can be used to compare the efficacy of investments in cogeneration equipment with other conservation investments. Estimates of the rates of return available on investments in cogeneration equipment are calculated and displayed. The effect of a 20% investment tax credit for cogeneration equipment and its possible drawbacks are discussed. (ERA citation 04:048863)

COO-2934-7 PC **A04**/MF **A01**
Giner, Inc., Waltham, MA.
Study of Corrosion and Its Control in Aluminum Solar Collectors. Annual Report, June 1, 1977–July 31, 1978.
D. Wong, F. H. Cocks, J. Giner, and P. S. Majahad. Aug 78, 68p
Contract EY-76-C-02-2934

The development of corrosion control methods for aluminum solar collectors using ethylene glycol heat transfer fluids was studied. Corrosion inhibitors and impurity scavengers have been tested and evaluated at temperatures up to 160 C under various laboratory conditions. A new corrosion rate measurement technique based on the use of thin foil samples was developed and adopted in this program to provide accelerated results. In addition to the development of corrosion control methods, the acquisition of baseline corrosion data was also extended to the aluminum/propylene glycol combination. Propylene glycol was chosen primarily because of its low toxicity. Aluminum corrosion characteristics were determined in 50, 85 and 100% propylene glycol solutions at temperatures between 25 to 160 C. Corrosion behavior of aluminum in more concentrated ethylene glycol solutions (up to 100%) at higher temperatures (up to 160 C) was also obtained in order to broaden the baseline. The cube root pit growth law was also verified experimentally. All the parameters needed to predict the time to plant failure due to pitting perforation were also determined. With regard to the aluminum/propylene glycol combination, aluminum alloys were found to be about ten times more corrosion resistant in propylene glycol than in ethylene glycol solutions under similar conditions. An extensive literature review showedthat phosphates, borates, nitrates and silicates and sodium mercaptobenzothiazole are effective corrosion inhibitors which are compatible with glycol solutions. It was determined that most inhibitor formulas, whether proprietary or prepared in-house, can reduce the overall aluminum corrosion rate to below 1 mpy at temperatures below 100 C. (ERA citation 04:049769)

COO-4049-11 PC **A02**/MF **A01**
Management and Technical Services Co., Bruceton, PA.
Operation and Maintenance of DOE/PERC Two-Stage MHD Pressurized Coal Combustor. Quarterly Activity Report, October 1, 1978–December 31, 1978.
31 Jan 79, 8p
Contract EY-76-C-02-4049

No abstract available.

COO-4094-38 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Test Plan for Phase-1 Residential Testing at the MIT/LL PV Systems Test Facility.
S. B. Sacco. 30 Mar 79, 23p
Contract EY-76-C-02-4094

This test plan describes the objectives, power system, instrumentation, and data processing for a utility off-peak photovoltaic power system to be tested at the MIT/LL Photovoltaic Systems Test Bed. This plan constitutes the first in a series of residential PV system tests that will be conducted at this facility. When subsequent tests are defined, they will be described in a test plan similar to this one. This test is designed to represent a residential system powering the diversified electrical load (stove, refrigerator, dryer, etc.) of a single-family residence. An 8-kW photovoltaic array is used along with 50-kW of lead-acid battery storage and a 6-kW dc-to-ac inverter. Leads, using actual appliances, are timer controlled to represent a typical residential usage profile and backup electrical power is provided by the local utility in an off-peak-only basis. (ERA citation 04:048270)

COO-4094-41 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Description of the MIT/Lincoln Laboratory Photovoltaic Systems Test Facility.
S. B. Sacco. 30 Jun 79, 26p
Contract EY-76-C-02-4094

This document describes the Massachusetts Institute of Technology/Lincoln Laboratory Photovoltaic Systems Test Facility and the mechanical and electrical interfaces for items to be tested. These interfaces include those for the solar array, batteries, inverters, and for backup DC power sources. Permanent power and instrumentation wiring at the facility are described in sufficient detail to permit test plans to be drawn up from these descriptions. (ERA citation 04:048271)

COO-4931-T10 PC **A02**/MF **A01**
Value Engineering Co., Alexandria, VA.
OTEC Support Services. Quarterly Technical Progress Report No. 3, 15 November 1978–14 February 1979.
28 Feb 79, 18p
Contract ET-78-C-02-4931

Technical engineering and management support services provided for the Ocean Thermal Energy Conversion Program of the Ocean Systems Branch, Division of Central Solar Technology are briefly described. The general task areas include (1) survey, analysis, evaluation, and recommendation concerning program performance; (2) program technical monitoring; (3) development and implementation of methodology to identify and evaluate program alternatives; (4) technical assessments; (5) OTEC system integration; and (6) environment and siting considerations. (ERA citation 04:049664)

DFE-18 PC **A06**/MF **A01**
Delegationen foer Energiforskning, Stockholm (Sweden).
Evaluation of the Work within the Field of Wind Energy.
E. Moberg. Mar 79, 111p
In Swedish.
U.S. Sales Only.

A careful analysis of the work going on during 1975 to 1978 within the field concerning the introduction of wind energy in Sweden is made. Suggestions for the planning and performance of future work in this field are also given. (ERA citation 04:049847)

DOE/EIA-0180(77) PC **A07**/MF **A01**
Energy Information Administration, Washington, DC.
Gas Turbine Electric Plant Construction Cost and Annual Production Expenses. Fifth Annual Supplement, 1977.
25 Jun 79, 134p

A total of 520 gas turbine electric plants owned and operated by electric utilities produced 28,849 million kWh during 1977, up from the net 1976 production of 23,580 million kWh. The installed capacity of these gas turbine electric plants at the end of 1977 was 47,935 megawatts, up 2.9% from the 46,576 megawatts in 1976. The total installed capacity of the 355 gas turbine electric plants included in this report was 38,585 megawatts at the end of 1977, and their net generation for that year totaled 20,917 million kWh. These plants account for approximately 80.5% of the total installed gas turbine electric plant capacity and 72.5% of the net gas turbine generation in 1977. The 1977 weighted average annual production expenses, including fuel, for the plants included in this report were 37.38 mills per kWh. Of this total, 30.76 mills were fuel costs. The weighted average cost of fuel burned in the 355 plants listed in this report was 218.91 cents per million Btu, but these costs were subject to wide variations. Distillate oil cost increased 14.5% in 1977 from the preceding year, increasing from 235.5 cents pr million Btu at the end of 1976 to 269.7 cents per million Btu at the end of December 1977. (ERA citation 04:050238)

DOE/EIA-0184/11 PC **A03**/MF **A01**
Energy Information Administration, Washington, DC.
Evaluation of Potential Short-Term Nuclear Availability Levels and Associated Electric Utility Alternate Fuel-Use Responses.
G. Clark, M. Gielecki, and B. Roberts. Jul 79, 47p

Short-term projections of nuclear power availability associated with various legislative and regulatory proposals that have been or are being considered are discussed. Projections of electric utility alternate fuel use and fuel expenditures associated with the levels of projected nuclear availability are also presented. Four proposed initiatives are analyzed with respect to their effects on nuclear power generation and electric utility alternate fuel use for the years 1979 and 1980. The cases analyzed assume business-as-usual, including the 3-month moratorium on all new nuclear plant licenses announced by the NRC in May 1979; that the NRC will require all nuclear pressurized water reactors to shut down for a 4-month period sometime prior to the end of 1980 in order to institute potential instrumentation and control room improvements resulting from the Three Mile Island accident investigation; assume that no nuclear operating licenses will be granted by the NRC until the state in which the applicant's plant is located has had its state emergency response plan approved; and assume that operating nuclear power plants in states without NRC-approved emergency response plans must be removed from service after April 1, 1980. (ERA citation 04:049945)

DOE/JPL-1012-3-T1 PC **A04**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Low-Cost Solar Array (LSA) Project. Project Quarterly Report No. 9, April–June 1978.
1978, 59p JPL-PUB-79-15
Contract EX-76-A-29-1012

Progress made by the Low-Cost Solar Array Project during the period April through June 1978 is described. It includes reports on silicon material processing, large-area silicon sheet development,

encapsulation materials testing and development, project engineering and operations activities, and manufacturing techniques, plus the steps taken to integrate these efforts. (ERA citation 04:048272)

DOE/JPL-1012-7-T3 PC **A03**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
LSA Project: Technology Development Update.
J. V. Goldsmith, and D. B. Bickler. 30 Aug 78, 27p
Contract EX-76-A-29-1012

Copies of the viewgraphs and a condensation of the comments by John V. Goldsmith and Donald B. Bickler of the LSA Project at its 10th Project Integration Meeting, August 16 and 17, 1978, at Caltech University, Pasadena, California, are presented. Their presentations focus on the state of the technology aimed at achieving the $500/kW goal by 1986. (ERA citation 04:048273)

DOE/JPL/1012-78/1(V.2) PC **A04**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Historical Evidence of Importance to the Industrialization of Flat-Plate Silicon Photovoltaic Systems.
J. L. Smith, W. R. Gates, and T. Lee. Apr 78, 69p JPL-PUB-78-36(V.2)
Contract EX-76-A-29-1012

The results of a literature search on the diffusion of new industrial production processes and the determinants of success of previous federally-funded demonstration projects are presented. The industrialization goal of the LSSA project is analyzed. The conclusions of that analysis are used to develop recommendations with respect to pilot, demonstration, and commercial scale production plants, as well as the disposition of the LSSA annual output goal. (ERA citation 04:048274)

DOE/JPL/1060-13 PC **A07**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
HEAP: Heat Energy Analysis Program. A Computer Model Simulating Solar Receivers.
F. L. Lansing. 15 Jan 79, 138p JPL-PUB-79-3
Contract EX-76-A-29-1060

Thermal design of solar receivers is commonly accomplished via approximate models, where the receiver is treated as an isothermal box with lumped quantities of heat losses to the surroundings by radiation, conduction and convection. These approximate models, though adequate for preliminary design purposes, are not detailed enough to distinguish between different receiver designs, or to predict transient performance under variable solar flux, ambient temperatures, etc. A computer code has been written for this purpose and is given the name HEAP, an acronym for Heat Energy Analysis Program. HEAP has a basic structure that fits a general heat transfer problem, but with specific features that are custom-made for solar receivers. The code is written in MBASIC computer language. This document explains the detailed methodology followed in solving the heat transfer problem, and includes a program flow chart, an explanation of input and output tables, and an example of the simulation of a cavity-type solar receiver. (ERA citation 04:048317)

DOE/JPL-1060-15 PC **A03**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Decision Analysis for Evaluating and Ranking Small Solar Thermal Power System Technologies. Volume I. A Brief Introduction to Multiattribute Decision Analysis.
A. Feinberg, and R. F. Miles, Jr. 1 Jun 78, 32p JPL-PUB-79-12
Contract EX-76-A-29-1060

Multiattribute decision analysis is a methodology for providing information to a decision maker for comparing and selecting between complex alternatives. A brief introduction to the principal concepts of the Keeney and Raiffa approach to multiattribute decision analysis is presented. The concepts of decision alternatives, outcomes, objectives, attributes and their states, attribute utility functions, and the necessary independence properties for the attribute states to be aggregated into a numerical representation of the preferences of the decision maker for the outcomes and the decision alternatives are presented. 50 references. (ERA citation 04:049656)

DOE/JPL/1060-4 PC **A08**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Techno-Economic Projections for Advanced Small Solar Thermal Electric Power Plants to Years 1990--2000.
T. Fujita, R. Manvi, E. J. Roschke, N. El Gabalawi, and G. Herrera. 15 Nov 78, 164p JPL-PUB-79-25
Contract EX-76-A-29-1060

Advanced technologies applicable to solar thermal electric power systems in the 1990--2000 timeframe are delineated for power applications that fulfill a wide spectrum of small power needs with primary emphasis on power ratings <10 MWe. Techno-economic projections of power system characteristics (energy and capital costs as a function of capacity factor) are made based on development of identified promising technologies. The key characteristic of advanced technology systems is an efficient low-cost solar energy collection while achieving high temperatures for efficient energy conversion. Two-axis tracking systems such as the central receiver or power tower concept and distributed parabolic dish receivers possess this characteristic. For these two basic concepts, advanced technologies including, e.g., conversion systems such as Stirling engines, Brayton/Rankine combined cycles and storage/transport concepts encompassing liquid metals, and reversible-reaction chemical systems are considered. In addition to techno-economic aspects, technologies are also judged in terms of factors such as developmental risk, relative reliability, and probability of success. Improvements accruing to projected advanced technology systems are measured with respect to current (or pre-1985) steam-Rankine systems, as represented by the central receiver pilot plant being constructed near Barstow, California. These improvements, for both central receivers and parabolic dish systems, indicate that pursuit of advanced technology across a broad front can result in post-1985 solar thermal systems having the potential of approaching the goal of competitiveness with conventional power systems; i.e., capital costs of $600 kWe and energy costs of 50 mills/kWe-hr (1977 dollars). (ERA citation 04:048311)

DOE/JPL/1060-6 PC **A11**/MF **A01**
Jet Propulsion Lab., Pasadena, CA.
Advanced Subsystems Development. Second Semi-Annual Progress Report, April 1--October 1, 1978.
15 Nov 78, 244p JPL-PUB-79-24
Contract EX-76-A-29-1060

The concept design for a small (less than 10 MWe) solar thermal electric generating plant was completed using projected 1985 technology. The systems requirements were defined and specified. The components, including an engineering prototype for one 15 kWe module of the generating plant, were conceptually designed. Significant features of the small solar thermal power plant were identified as the following: (1) 15-kWe Stirling-cycle engine/alternator with constant power output; (2) 10-meter point-focusing paraboloidal concentrator with cantilevered cellular glass reflecting panels; (3) primary heat pipe with 800 exp 0 C output solar cavity receiver; (4) secondary heat pipe with molten salt thermal energy storage unit; (5) electric energy transport system; and (6) advanced battery energy storage capability. The present emphasis for achieving cost reduction goals centers on improving conversion efficiency and reducing the cost of key components. (ERA citation 04:048312)

DOE/JPL/954144-1 PC **A16**/MF **A01**
International Business Machines Corp., Hopewell Junction, NY. East Fishkill Lab.
Silicon Ribbon Growth by a Capillary Action Shaping Technique. Final Report, May 8, 1975--November 8, 1977.
G. H. Schwuttke, T. F. Ciszek, and A. Kran. 1977, 353p
Contract NAS-7-100-954144

The crystal growth method under investigation is a capillary action shaping technique. Meniscus shaping for the desired ribbon geometry occurs at the vertex of a wettable die. As ribbon growth depletes the melt meniscus, capillary action supplies replacement material. The objective of the work is to attain a clear technological assessment of silicon ribbon growth by the capillary action shaping technique and to enhance the applicability of the technique to photovoltaic power device material. The results of crystal growth studies, structural and electrical characterization of cast silicon ribbons, and a silicon ribbon technology assessment are described. (ERA citation 04:048275)

DOE/JPL/954527-8 PC **A08**/MF **A01**
Springborn Labs., Inc., Enfield, CT.
Investigation of Test Methods, Material Properties, and Processes for Solar Cell Encapsulants. Annual Report.
P. B. Willis, B. Baum, and R. A. White. Jun 78, 164p
Contract NAS-7-100-954527

Springborn Laboratories is engaged in a study of evaluating potentially useful encapsulating materials for the encapsulation task of the Low-Cost Solar Array project (LSA) funded by the Department of Energy. The goal of this program is to identify, evaluate, and recommend encapsulant materials (other than glass) and processes for the production of cost-effective, long-life photovoltaic solar modules. The results of an investigation of solar module encapsulation systems applicable to the Low-Cost Solar Array project 1986 cost and performance goals are presented. The 1986 cost goal for a 20 year life solar cell module is $0.50 per watt or $5 per square foot (in 1975 dollars). Out of this cost goal, $0.25 per square foot is currently allocated for the encapsulation in terms of raw materials, exclusive of labor. Assuming the flat-plate collector to be the most efficient module design, six basic construction elements were identified and their specific uses in module construction defined. In order to generate a comparative analysis, a uniform costing basis was established for each element. Extensive surveys into commercially available materials were then conducted in order to identify either general classes or specific products suitable for use for each construction element. The survey results were also useful in revealing price ranges for classes of materials and estimating the cost allocation for each element within the encapsulation cost goal. (ERA citation 04:049640)

DOE/NASA/1028-79/23 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Wind Turbines for Electric Utilities: Development Status and Economics.
J. R. Ramler, and R. M. Donovan. 1979, 22p NASA-TM-79170, CONF-790611-4
Contract EX-76-A-29-1028
AIAA terrestrial energy systems conference, Orlando, FL, USA, 4 Jun 1979.

The technology and economics of the large, horizontal-axis wind turbines currently in the Federal Wind Energy Program are presented. Wind turbine technology advancements made in the last several years are discussed. It is shown that, based on current projections of the costs of these machines when produced in quantity, they should be attractive for utility application. The cost of electricity (COE) produced at the busbar is shown to be a strong function of the mean wind speed at the installation site. The breakeven COE as a fuel saver is discussed and the COE range that would be generally attractive to utilities is indicated. (ERA citation 04:048509)

DOE/NASA/20485-79/1 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Description of Photovoltaic Village Power Systems in the United States and Africa.
A. F. Ratajczak, and W. J. Bifano. 1979, 14p NASA-TM-79149, CONF-790457-4
1979 photovaltaic solar energy conference, West Berlin, F.R. Germany, 23 Apr 1979.

The NASA Lewis Research Center has designed, fabricated, and installed two photovoltaic power systems in remote villages in the United States and Africa. These projects were undertaken to demonstrate that existing photovoltaic system technology is capable of providing electrical power

for basic domestic services for the millions of small, remote communities in both developed and developing countries. One system is located in the Papago Indian Village of Schuchuli in southwest Arizona (USA) and bacame operational 16 December 1978. The other system is located in Tangaye, a rural village in Upper Volta, Africa. It became operational 1 March 1979. The Schuchuli system has a 3.5 kW (peak) solar array which provides electric power for village water pumping, a refrigerator for each family, lights in the village buildings, and a community washing machine and sewing machine. The 1.8 kW (peak) Tangaye system provides power for community water pumping, flour milling and lights in the milling building. These are both stand-alone systems (i.e., no back-up power source) which are being operated and maintained by local personnel. Both systems are insutrumented. Systems operations are being monitored by NASA to measure design adequacy and to refine designs for future systems. Baseline socioeconomic studies have been performed for both villages. Follow-up studies are planned to determine the impact of the power systems on the villagers. The designs, hardware, and installations for both systems are described. (ERA citation 04:048276)

DOE/NASA/20485-79/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Social and Economic Impact of Solar Electricity at Schuchuli Village: A Status Report.
W. J. Bifano, A. F. Ratajczak, D. M. Bahr, and B. G. Garrett. 1979, 18p NASA-TM-79194

Schuchuli, a small remote village on the Papago Indian Reservation in southwest Arizona, is 27 kilometers (17 miles) from the nearest available utility power. In some respects, Schuchuli resembles many of the rural villages in other parts of the world. For example, it's relatively small in size (less than 100 residents), composed of a number of extended family groupings, and remotely situated relative to major population centers (190 km, or 120 miles, from Tucson). Its lack of conventional power is due to the prohibitive cost of supplying a small electrical load with a long-distance distribution line. Furthermore, alternate energy sources are expensive and place a burden on the resources of the villagers. On December 16, 1978, as part of a federally funded project, a solar cell power system was put into operation at Schuchuli. The system powers the village water pump, lighting for homes and other village buildings, family refrigerators and a communal washing machine and sewing machine. The project, managed for the US Department of Energy by the NASA Lewis Research Center, provides for two years of technical monitoring as well as a one-year socio-economic study to assess the impact of a relatively small amount of electricity on the basic living environment of the villagers. The project background, implementation details and current status of the technical and socio-economic assessment are presented. (ERA citation 04:049641)

DTNSRDC-79/054 PC **A06**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD.
Corrosion and Biofouling on the Non-Heat-Exchanger Surfaces of an Ocean Thermal Energy Conversion Power Plant: A Survey.
V. J. Castelli. May 79, 106p
Contract EY-76-C-06-1830

Of the many foreseeable problems confronting economical ocean thermal energy conversion operation, two major items are the deterioration of the structural and functional components, which prevents efficient operation, and the biofouling of the surfaces, which adds excess weight to the floating ocean platform. The techniques required for effective long-term control of deterioration and corrosion have been investigated actively for many years, and successful solutions for most situations have been developed. For the most part, these solutions can be directly transferred to the ocean thermal energy conversion plant. The majority of problems in these areas are expected to be associated with scale-up and will require some advanced development due to the immensity of the ocean thermal energy conversion platform. Current antifouling control systems are not effective for long-term fouling prevention. Commercially available antifouling coatings are limited to a 3-year service life in temperate waters, and even shorter in tropical waters. However, underwater cleaning techniques and some fouling-control systems presently being used by conventional power plants may find utility on an ocean thermal energy conversion plant. In addition, some recent major advances in long-term antifouling coatings sponsored by the Navy may be applicable to ocean thermal energy conversion. 132 references. (ERA citation 04:048327)

EPRI-ER-978(V.2) PC **A15**/MF **A01**
General Electric Co., Schenectady, NY. Electric Utility Systems Engineering Dept.
Requirements Assessment of Wind Power Plants in Electric Utility Systems. Final Report.
W. D. Marsh. Jan 79, 339p

A rational aproach is presented to the consideration of wind power plants applied to electric utility systems. A requirements assessment and preliminary impact and penetration analyses by studying wind generation in three actual utility systems are included. Conventional utility loss-of-load probability and production simulation methods were used, together with a wind turbine generator (WTG) performance model developed for the study. Evaluations were based on comparison of total utility generation system costs with and without wind plants, and were expressed in terms of wind power plant value and cost. Value is measured by the value of displaced energy and capacity of conventional power plants. Cost consists of the capital, and operating and maintenance costs of the wind plant. (ERA citation 04:049840)

FE-2357-22 PC **A05**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
CFCC Development Program. Quarterly Report, October--December 1977.
May 78, 84p
Contract EX-76-C-01-2357

Progress is reported in a research program whose objective is to evaluate the coal-fired combined cycle (CFCC) power plant conceptual design, of the pressurized fluidized-bed type, with power recovery gas turbine and to conduct a supporting development program. The supporting development is required for evaluating the pressurized fluidized-bed combustion concept, for developing engineering correlations to be used in optimizing the commercial plant concept, and for evaluating the combustor/steam generator, the hot-gas cleanup, and the advanced gas turbine materials approach for this application. The results of this program will provide a backup concept and program for commercialization of pressurized fluidized-bed combustion. During this reporting period the following results were obtained: evaluation of test results proceeded; particle size distribution down to 1 mu was developed based upon measured data. Included in this evaluation was a study of different techniques for particle sizing. Chemical analysis of captured particles was evaluated as a function of particle size, leading to the conclusion that the ash tends to segregate in the small size end of the distribution while the spent and unspent sorbent tends to concentrate in the larger sizes. Trace element analysis, including lead, arsenic, selenium, beryllium, mercury antimony and cadmium were completed for the CFCC design. In all cases, the ground level concentrations were significantly below prevailing standards. Alternate combustor-steam generator configurations were considered. Based upon accumulated exposure of 2800 hr in two burner rig simulations, candidate material protection systems were selected for exposure during future tests. The other actual PFB exposure program has completed its 100 hr shakedown testing. (ERA citation 04:048520)

FE-2357-25 PC **A03**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
CFCC Development Program. Quarterly Report, January--March 1978.
Jul 78, 44p
Contract EX-76-C-01-2357

Progress is reported in the development of a coal-fired combined cycle power plant which uses steam produced in tubes within the fluidized-bed combustor to drive the steam turbine and combustion gases from the pressurized fluidized-bed combustor to drive the gas turbine. The reference plant configuration for the Design Review has been defined. Specifically, a configuration that represents current development hardware has been specified. Continuing combustor-steam generator configuration studies have included evaluation of refractory lined pressure vessels and horizontal pressure vessel, water wall lined. In the latter, a combined bed configuration appears to provide substantial advantages. The test of shrouded hot gas ducting at the size and temperature of the CFCC configuration was initiated. Initial results are favorable. Small burner rig simulation testing continues with several materials consistently showing strong performance. Process evaluation to verify that new materials can be applied to turbine buckets, is proceeding. Materials performance data on clad specimens is being evaluated and indicates reasonable success in this area. Testing of the developmental cyclone is progressing at a slower pace than anticipated due to test setup difficulties which are being overcome. The Aerodyne cyclone, diagnostic probes, electrostatic charger and materials test section have been shipped to CURL at Leatherhead, England. CURL has essentially completed engineering design of the facility modification and actual implementation of the modifications will now take place. (ERA citation 04:048521)

FE-2357-28 PC **A07**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
CFCC Development Program. Commercial Plant Design Definition (Task 1.2).
Mar 78, 147p
Contract EX-76-C-01-2357

Progress is reported in a research program whose objective is to evaluate the coal fired combined cycle (CFCC) powerplant conceptual design, of the pressurized fluidized bed type, with power recovery gas turbine and to conduct a supporting development program. The supporting development is required for evaluating the pressurized fluidized bed combustion concept, for developing engineering correlations to be used in optimizing the commercial plant concept, and for evaluating the combustor/steam generator, the hot-gas cleanup, and the advanced gas turbine materials approach for this application. The results of this program will provide a backup concept and program for commercialization of pressurized fluidized bed combustion. This report summarizes the CFCC commercial power plant and major component conceptual design activities of the overall program preparatory to the planned design review. The purpose of this activity was to establish a reference configuration for evaluation through trade-off studies conducted parallel with the design effort. A second more detailed plant design definition and costing phase is planned following the design review, based upon a reference plant design either confirmed or modified by the trade-off studies. Critical plant technology areas are also being pursued as part of the overall program in parallel with the design and trade-off tasks, including gas turbine materials, hot gas cleanup and pressurized fluidized bed boiler (PFBB) technology. Certain of the test programs, especially long-term materials testing, are not scheduled to be finished prior to completion of the plant design activities; thus, further plant design updates based upon completion of technology tests can be expected. Certain critical design assumptions, specifically gas turbine materials life with respect to hot corrosion, cannot be verified until the long-term test results are available and are subject to change based upon test results. (ERA citation 04:048522)

FE-2357-34 PC **A04**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
CFCC Development Program. Preliminary Turbine Materials Evaluation for Commercial Plant (Task 3).
Mar 78, 62p
Contract EX-76-C-01-2357

Progress is reported in a research program whose objective is to evaluate the coal fired combined cycle (CFCC) powerplant conceptual design, of the pressurized fluidized bed type, with power recovery gas turbine and to conduct a supporting development program. The supporting development

is required for evaluating the pressurized fluidized bed combustion concept, for developing engineering correlations to be used in optimizing the commercial plant concept, and for evaluating the combustor/steam generator, the hot-gas cleanup, and the advanced gas turbine materials approach for this application. The results of this program will provide a backup concept and program for commercialization of pressurized fluidized bed combustion. During this reporting period cladding materials for gas turbine components were tested for corrosion and strength characteristics. These tests and their results are described. (ERA citation 04:048523)

FE-2357-36 PC **A04**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
CFCC Development Program. Hot Gas Clean-Up Efflux Characterization for Commercial Plant (Task 4.1.1).
Mar 78, 56p
Contract EX-76-C-01-2357

Progress is reported in a research program whose objective is to evaluate the coal-fired combined cycle (CFCC) power plant conceptual design, of the pressurized fluidized-bed type, with power recovery gas turbine and to conduct a supporting development program. The supporting development is required for evaluating the pressurized fluidized-bed combustion concept, for developing engineering correlations to be used in optimizing the commercial plant concept, and for evaluating the combustor/steam generator, the hot-gas cleanup, and the advanced gas turbine materials approach for this application. The results of this program will provide a backup concept and program for commercialization of pressurized fluidized-bed combustion. During this reporting period results were obtained for the chemical and physical properties of combustion products from the fluidized-bed combustor, and the flow rate and size distribution of particles in the combustor effluent. (ERA citation 04:048524)

FE-2357-37 PC **A03**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
CFCC Development Program. Performance Guidelines for Commercial Plant (Task 4.1.2).
Mar 78, 45p
Contract EX-76-C-01-2357

Progress is reported in a research program whose objective is to evaluate the coal-fired combined cycle (CFCC) power plant conceptual design, of the pressurized fluidized-bed type, with power recovery gas turbine and to conduct a supporting development program. The supporting development is required for evaluating the pressurized fluidized-bed combustion concept, for developing engineering correlations to be used in optimizing the commercial plant concept, and for evaluating the combustor/steam generator, the hot-gas cleanup, and the advanced gas turbine materials approach for this application. The results of this program will provide a backup concept and program for commercialization of pressurized fluidized-bed combustion. During this reporting period the characteristics of hot gases from the fluidized-bed combustor, the effects of these combustion products on turbine corrosion and erosion, and the performance requirements for hot-gas cleanup equipment were studied. (ERA citation 04:048525)

KFK-CAD-118 PC **A09**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekttraegerschaft Rechnerunterstuetztes Entwickeln, Konstruieren und Fertigen.
Planning, Design, and Supervision of Electrical Engineering.
J. Bethmann, D. Klein, S. Koldau, K. Lottmann, and P. Mehring. Mar 79, 199p
In German.Seminar held at the Haus der Technik, Essen, Germany, F.R. 8 Mar 1979.
U.S. Sales Only.

These proceedings contain the six papers presented at the seminar on CAD/CAM (Computer-aided design/computer-aided manufacturing) in the planning, design, and development of electrical installations. The aim of the meeting was to present information on development and design in electrical engineering. The possibilities of some data processing programs are presented and their practical applications are demonstrated. The topics discussed are: the CAD/CAM research program, support of engineering developments in the planning and construction of electrical installations, simulation of power electronic installations with the NETASIM digital simulation systems, selection of motors, cables, and switches using the PEKA program, manufacturing control for control electronics, and CAD/CAM development of electrical installations for energy production, distribution, and use. (ERA citation 04:048514)

LA-7866-TASE PC **A06**/MF **A01**
Los Alamos Scientific Lab., NM.
Decentralized Solar Photovoltaic Energy Systems.
M. C. Krupta. Jun 79, 110p
Contract W-7405-ENG-36

Environmental data for the decentralized solar photovoltaic systems have been generated in support of the Technology Assessment of Solar Energy Systems program (TASE). Emphasis has been placed upon the selection and use of a model residential photovoltaic system to develop and quantify the necessary data. The model consists of a reference home located in Phoenix, AZ utilizing a unique solar cell array-roof shingle combination. Silicon solar cells, rated at 13.5% efficiency at 28 exp 0 C and 100 mW/cm exp 2 (AMI) insolation are used to generate approx. 10 kW (peak). An all-electric home is considered with lead-acid battery storage, dc-ac inversion and utility backup. The reference home is compared to others in regions of different insolation. Major material requirements, scaled to quad levels of end-use energy include signifcant quantities of silicon, copper, lead, antimony, sulfuric acid and plastics. Operating residuals generated are negligible with the exception of those from the storage battery due to a short (10-year) lifetime. Land requirements are negligible. Water requirements are minor. Advanced production techniques are still undergoing development precluding adequate determination of production process residuals. A brief general discussion of other environmental, health, and safety and resource availability impacts is presented. (ERA citation 04:048279)

LBL-8520 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
New Solar Thermal Receiver Utilizing a Small Particle Heat Exchanger.
A. J. Hunt. Apr 79, 17p CONF-790803-32
Contract W-7405-ENG-48
14. intersociety energy conversion conference, Boston, MA, USA, 5 Aug 1979.

A dispersion of small absorbing particles forms an ideal system to collect radiant energy from concentrated sunlight to heat a pressurized gas that when expanded through a turbine will produce useful mechanical energy. A new type of solar thermal receiver based on this concept is being developed at LBL that is to be placed at the focus of a central tower or a parabolic dish concentrator system. An open cycle Brayton heat engine utilizing a Small Particle Heat Exchange Receiver (SPHER) operates by compressing ambient air and injecting a very small mass of fine particles into the gas stream. The air particle mixture enters a transparent heating chamber where the solar flux is concentrated. The particles absorb the radiation and because of their very large surface area, quickly release the heat to the surrounding gas. The air-particle mixture continues to heat until the particles vaporize. The optical efficiency of the receiver is 85 to 90% without a cavity and the thermodynamic efficiency of the Brayton cycle is greater than 40%. Calculations of the optical, thermal, and physical processes have been performed; candidate receiver designs and window materials have been determined; and the feasibility demonstrated in the laboratory. (ERA citation 04:048314)

N79-31499/3 PC **A06**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Analytical Core Loss Calculations for Magnetic Materials Used in High Frequency High Power Converter Applications.
Ph.D. Thesis - Toledo Univ.
J. E. Triner. Aug 79, 103p NASA-TM-79234, E-9993

The basic magnetic properties under various operating conditions encountered in the state-of-the-art DC-AC/DC converters are examined. Using a novel core excitation circuit, the basic B-H and loss characteristics of various core materials may be observed as a function of circuit configuration, frequency of operation, input voltage, and pulse-width modulation conditions. From this empirical data, a mathematical loss characteristics equation is developed to analytically predict the specific core loss of several magnetic materials under various waveform excitation conditions.

N79-31754/1 PC **A05**/MF **A01**
Tylan Corp., Torrance, CA.
Vitre-Graf Coating on Mullite. Low Cost Silicon Array Project: Large Area Silicon Sheet Task.
Final Report, 14 Dec. 1977 - 13 Jun. 1979.
R. C. Rossi. Jun 79, 81p NASA-CR-162269, DOE/JPL-954896-79/1
Contract JPL-954896
Subm-Prepared for JPL and DOE.

The processing parameters of the Vitre-Graf coating for optimal performance and economy when applied to mullite and graphite as substrates were presented. A minor effort was also performed on slip-cast fused silica substractes.

N79-31755/8 PC **A03**/MF **A01**
California Univ., Los Angeles.
Silicon Solar Cell Fabrication Technology.
Quarterly Report, 1 Jan. - 30 Apr. 1979.
O. M. Stafsudd. 2 May 79, 34p NASA-CR-162166, DOE/JPL-954902-79/4
Contract JPL-954902
Subm-Sponsored in Part by Doe Prepared for JPL.

The laser cell scanner was used to characterize a number of solar cells made in various materials. An electron beam-induced current (EBIC) study was performed using a stereoscan scanning electron microscope. Planar p-n junctions were analyzed. A theory for the EBIC based on the analytical solution of the ambipolar diffusion equation under the influence of electron beam excitation parameter z (which is related to beam penetration), the junction depth Z sub j, the beam current and the surface recombination, was formulated and tested. The effect of a grain boundary was studied.

N79-31756/6 PC **A02**/MF **A01**
Battelle Columbus Labs., OH.
Evaluation of Selected Chemical Processes for Production of Low-Cost Silicon, Phase 3.
Quarterly Progress Report, 1 Apr. - 30 Jun. 1979.
J. M. Blocher, Jr., and M. F. Browning. 15 Aug 79, 18p NASA-CR-162168, DOE/JPL-954339-79/15
Contracts NAS7-100, JPL-954339
Subm-Sponsored in Part by DOE Prepared for JPL Compounds.

The construction and operation of an experimental process system development unit (EPSDU) for the production of granular semiconductor grade silicon by the zinc vapor reduction of silicon tetrachloride in a fluidized bed of seed particles is presented. The construction of the process development unit (PDU) is reported. The PDU consists of four critical units of the EPSDU: the fluidized bed reactor, the reactor by product condenser, the zinc vaporizer, and the electrolytic cell. An experimental wetted wall condenser and its operation are described. Procedures are established for safe handling of SiCl4 leaks and spills from the EPSDU and PDU.

N79-31757/4 PC **A04**/MF **A01**
Optical Coating Lab., Inc., City of Industry, CA. Photoelectronics Div.
Development of Low Cost Contacts to Silicon Solar Cells.
Semiannual Report, 15 Oct. 1978 - 31 May 1979.
P. A. Iles, and D. P. Tanner. 31 May 79, 74p NASA-CR-162179, DOE/JPL-955244-79/2
Contract JPL-955244
Subm-Sponsored by NASA Prepared for DOE and JPL.

Different electroless plating systems were evaluated in conjunction with copper electroplating. All tests involved simultaneous deposition of front and back contacts using a standard cell materials. Cells with good adhesion and good curve fill fac-

tors were obtained using a palladium-chromium-copper metallization system. The final copper contact system was evaluated to determine if the copper would migrate at elevated temperatures. The copper migrated at elevated temperatures causing cell output degradation.

N79-31758/2 PC **A04**/MF **A01**
RCA Labs., Princeton, NJ.
Epitaxial Silicon Growth for Solar Cells.
Final Report.
R. V. Daiello, P. H. Robinson, and D. Richman. Apr 79, 66p NASA-CR-162177, DOE/JPL-954817-79/4
Contracts NAS7-100, JPL-954817
Subm-Prepared for DOE and JPL.

The epitaxial procedures, solar cell fabrication, and evaluation techniques are described. The development of baseline epitaxial solar cell structures grown on high quality conventional silicon substrates is discussed. Diagnostic layers and solar cells grown on four potentially low cost silicon substrates are considered. The crystallographic properties of such layers and the performance of epitaxially grown solar cells fabricated on these materials are described. An advanced epitaxial reactor, the rotary disc, is described along with the results of growing solar cell structures of the baseline type on low cost substrates. The add on cost for the epitaxial process is assessed and the economic advantages of the epitaxial process as they relate to silicon substrate selection are examined.

N79-31759/0 PC **A03**/MF **A01**
RCA Labs., Princeton, NJ.
Automated Array Assembly, Phase 2.
Quarterly Report.
R. V. Daiello. Jun 79, 36p NASA-CR-162176, DOE/JPL-954868-79/7
Contracts NAS7-100, JPL-954868
Subm-Prepared for DOE and JPL.

The large scale production of silicon solar cell array panels is discussed. The cost and performance of three manufacturing sequences designed to convert silicon sheet and wafers into solar panels is analyzed. The production of ion implanted and furnace annealed solar cells made using solar grade n- and p-type wafers is examined. The performance of production size lots is examined with regard to the relationship between the ion implant and furnace anneal parameters and the ability to form consistently good thick film screen printed contacts. The spray on antireflection coating process is evaluated. The performance of several lots of cells before and after coating is measured. The structure and refractive index of the RCA I (TiO2) coating is compared with commercial solutions. Sensitivity of coated, screen printed cells to the post heat treatment required to cure the films is assessed.

N79-31760/8 PC **A02**/MF **A01**
Siltec Corp., Menlo Park, CA.
Lsa Large Area Silicon Sheet Task. Continuous Liquid Feed Czochralski Growth.
Quarterly Report, Apr. - Jun. 1979.
G. Fiegl. Jul 79, 22p NASA-CR-162178, DOE/JPL-954886-79/3
Contract JPL-954886
Subm-Sponsored by NASA Prepared for Doe and JPL.

The design and development of equipment and processes to demonstrate continuous growth of crystals by the Czochralski method suitable for producing single silicon crystals for use in solar cells is presented. The growth of at least 150 kg of mono silicon crystal, 150 mm in diameter is continuous from one growth container. A furnace with continuous liquid replenishment of the growth crucible, accomplished by a meltdown system with a continuous solid silicon feed mechanism and a liquid transfer system, with associated automatic feedback controls is discussed. Due to the silicon monoxide build up in the furnace and its retarding effect on crystal growth the furnace conversion for operation in the low pressure range is described. Development of systems for continuous solid recharging of the meltdown chamber for various forms of poly silicon is described.

N79-31761/6 PC **A03**/MF **A01**
SOL/LOS, Inc., Los Angeles, CA.
A New Method of Metallization for Silicon Solar Cells.
Quarterly Report, 1 Apr. - 30 Jun. 1979.
M. Macha. 30 Jun 79, 27p NASA-CR-162164, DOE/JPL-955318-79
Contract JPL-955318
Subm-Sponsored by NASA and DOE Prepared for JPL.

The determination of the firing cycle in a horizontal tube furnace for MoO3: Sn ink composition applied by silk screening process on P or N structured solar cells is presented. In comparison with the strip heater used to determine the reaction mechanism, the reduction of MoO3 in the tube furnace progresses at a much faster rate and the Sn:Mo alloy forms at a much lower temperature. The device characteristics determined by the V-I curve showed a high resistance (approx. 10 Ohms) at peak temperatures between 600 C and 800 C. The high series resistance is attributed to the lack of formation of MoSi2 within the used temperature range.

N79-31762/4 PC **A04**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Silicon Web Process Development.
Quarterly Report, 20 Apr. - 30 Jun. 1979.
C. S. Duncan, R. G. Seidensticker, R. H. Hopkins, J. P. Mchugh, and F. E. Hill. 30 Jun 79, 55p NASA-CR-162181, DOE/JPL-954654-79/3
Contract JPL-954654
Subm-Sponsored by NASA Prepared for DOE and JPL.

Silicon dendritic web ribbons, capable of fabrication into solar cells with greater than 15% AMI conversion efficiency, were produced from the melt without die shaping. Improvements were made both in the width of the web ribbons grown and in the techniques to replenish the liquid silicon as it is transformed to web. Through means of improved thermal shielding, stress was reduced sufficiently so that web crystals nearly 4.5 cm wide were grown. The development of two subsystems, a silicon feeder and a melt level sensor, necessary to achieve an operational melt replenishment system, are described. A gas flow management technique is discussed and a laser reflection method to sense and control the melt level as silicon is replenished is examined.

N79-31763/2 PC **A05**/MF **A01**
TRW Systems Group, Redondo Beach, CA. Manufacturing Div.
Study of Automated Module Fabrication for Lightweight Solar Blanket Utilization.
Final Report.
C. E. Gibson. May 79, 79p NASA-CR-162157, TRW-79.5536.3-06
Contracts NAS7-100, JPL-955205
Subm-Prepared for JPL.

Cost-effective automated techniques for accomplishing the titled purpose; based on existing in-house capability are described. As a measure of the considered automation, the production of a 50 kilowatt solar array blanket, exclusive of support and deployment structure, within an eight-month fabrication period was used. Solar cells considered for this blanket were 2 x 4 x .02 cm wrap-around cells, 2 x 2 x .005 cm and 3 x 3 x .005 cm standard bar contact thin cells, all welded contacts. Existing fabrication processes are described, the rationale for each process is discussed, and the capability for further automation is discussed.

N79-31765/7 PC **A04**/MF **A01**
Solarex Corp., Rockville, MD.
High Efficiency, High Density Terrestrial Panel.
Final Report.
J. Wohlgemuth, M. Wihl, and T. Rosenfield. Feb 79, 70p NASA-CR-162167, DOE/JPL-954822-78/1
Contract JPL-954822
Subm-Sponsored in Part by DOE Prepared for JPL.

Terrestrial panels were fabricated using rectangular cells. Packing densities in excess of 90% with panel conversion efficiencies greater than 13% were obtained. Higher density panels can be produced on a cost competitive basis with the standard salami panels.

N79-31766/5 PC **A09**/MF **A01**
South Carolina Univ., Columbia. College of Engineering.
Web-Dendritic Growth.
Final Report, Oct. 1975 - Aug. 1977.
R. B. Hilborn, J. W. Faust, Jr., and C. Rhodes. Aug 77, 186p NASA-CR-162175, DOE/JPL-954344-78/1
Contracts NAS7-100, JPL-954344

The effects of various machine design parameters on the growth of web dendritic silicon ribbon were investigated. Ribbons were grown up to lengths of one meter, with widths increasing linearly up to one cm at the point of termination of growth. Thermal data were collected and evaluated for actual seeding and growth with variations in parameters affecting heat loss. It was found that for suitable growth, the mechanical system should be very rigid and stable, and the tolerances and specifications of the quartz crucibles must be far tighter than normal quartz tolerances. The widening rates of the ribbons were found to be a function of the temperature gradient rather than the temperature differences alone. A twin spacing in the seed of 3 microns to 2 microns was found to be unfavorable for growth; whereas spacing of 0.9 microns to 2 microns and 8 microns to 2 microns were favorable. Thermal modeling studies of the effects of furnace design parameters on the temperature distributions in melt and the growth of the dendritic web ribbon showed that the pull rate of the ribbon is strongly dependent on the temperature of the top thermal shield, the spacing between this shield and the melt, and the thickness of the growing web.

N79-31767/3 PC **A02**/MF **A01**
Solarex Corp., Rockville, MD.
Development of an Improved High Efficiency Thin Silicon Solar Cell.
Quarterly Report.
G. Storti, and C. Wrigley. Jul 79, 18p NASA-CR-162159, SX/115/7Q
Contracts NAS7-100, JPL-954883
Subm-Prepared for JPL.

Breakage and front contact failure in high efficiency, textured ultrathin cells was reduced as a consequence of the introduction of process modifications. In a small production run, over one hundred ultrathin cells, having an average AMO efficiency of 13%, were fabricated from 10-25 ohm cm silicon. An in-house aluminum paste for back surface field formation was developed that resulted in cell efficiencies equivalent to those from commercial pastes. The quality of the back surface field was found to be dependent on the orientation of the silicon slice during alloying.

N79-31768/1 PC **A03**/MF **A01**
Energy Materials Corp., Harvard, MA.
Low Cost Solar Array Project. Task 1: Silicon Material, Gaseous Melt Replenishment System.
Quarterly Progress Report, 17 Apr. - 17 Jul. 1979.
D. N. Jewett, H. E. Bates, and D. M. Hill. Jul 79, 26p NASA-CR-162270, DOE/JPL-955269-79-1
Contract JPL-955269
Subm-Prepared for JPL and DOE.

A system to combine silicon formation, by hydrogen reduction of trichlorosilane, with the capability to replenish a crystal growth system is described. A variety of process parameters to allow sizing and specification of gas handling system components was estimated.

N79-31769/9 PC **A09**/MF **A01**
Pennsylvania Univ., Philadelphia. Moore School of Electrical Engineering.
Analysis and Evaluation in the Production Process and Equipment Area of the Low-Cost Solar Array Project.
Quarterly Report, Jan. - Apr. 1979.
H. Goldman, and M. Wolf. Jun 79, 176p NASA-CR-162163, DOE/JPL-954796-79/6
Contract JPL-954796
Subm-Sponsored by NASA and DOE Prepared for JPL.

The manufacturing methods for photovoltaic solar energy utilization are assessed. Economic and technical data on the current front junction formation processes of gaseous diffusion and ion im-

plantation are presented. Future proposals, including modifying gaseous diffusion and using ion implantation, to decrease the cost of junction formation are studied. Technology developments in current processes and an economic evaluation of the processes are included.

N79-31770/7 PC **A05**/MF **A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Silicon Materials Task of the Low Cost Solar Array Project, Phase 3. Effect of Impurities and Processing on Silicon Solar Cells.
Quarterly Report, Apr. - Jun. 1979.
R. H. Hopkins, J. R. Davis, P. D. Blais, A. Rohatgi, and R. B. Campbell. Jul 79, 78p NASA-CR-162276, QR-15
Contract JPL-954331
Subm-Sponsored by NASA Prepared for JPL.

The effects of impurities, various thermochemical processes, and any impurity process interactions on the performance of terrestrial silicon solar cells are defined. Determinations of the segregation coefficients of tungsten, tantalum, and cobalt for the Czochralski pulling of silicon single crystals are reported. Sensitive neutron activation analysis was used to determine the metal impurity content of the silicon while atomic absorption was used to measure the metal content of the residual liquid from which the doped crystals were grown. Gettering of Ti doped silicon wafers improved cell performance by one to two percent for the highest temperatures and longest times. The HCl is more effective than POCl3 treatments for deactivating Ti but POCl3 and HCl produced essentially identical results for Mo or Fe.

N79-31771/5 PC **A04**/MF **A01**
Sensor Technology, Inc., Chatsworth, CA.
Automated Array Assembly Task In-Depth Study of Silicon Wafer Surface Texturizing.
Quarterly Technical Report, 14 Dec. 1978 - 31 Mar. 1979.
G. T. Jones, S. Chitre, S. S. Rhee, and K. L. Allison. Mar 79, 51p NASA-CR-162161, DOE/JPL-955266-79/1
Contract JPL-955266
Subm-Sponsored by NASA and DOE Prepared for JPL.

A low cost wafer surface texturizing process was studied. An investigation of low cost cleaning operations to clean residual wax and organics from the surface of silicon wafers was made. The feasibility of replacing dry nitrogen with clean dry air for drying silicon wafers was examined. The two stage texturizing process was studied for the purpose of characterizing relevant parameters in large volume applications. The effect of gettering solar cells on photovoltaic energy conversion efficiency is described.

N79-31772/3 PC **A09**/MF **A01**
Materials Research, Inc., Centerville, UT.
Quantitative Analysis of Defects in Silicon.
Quarterly Progress Report, 1 Apr. - 31 Jun. 1979.
R. Natesh, J. M. Smith, H. A. Qidwai, and T. Bruce. 12 Jul 79, 177p NASA-CR-162173, MRI-273
Contract JPL-954977
Subm-Sponsored by NASA Prepared for DOE and JPL.

The evaluation and prediction of the conversion efficiency for a variety of silicon samples with differences in structural defects, such as grain boundaries, twin boundaries, precipitate particles, dislocations, etc. are discussed. Quantitative characterization of these structural defects, which were revealed by etching the surface of silicon samples, is performed by using an image analyzer. Due to different crystal growth and fabrication techniques the various types of silicon contain a variety of trace impurity elements and structural defects. The two most important criteria in evaluating the various silicon types for solar cell applications are cost and conversion efficiency.

N79-31773/1 PC **A09**/MF **A01**
Sensor Technology, Inc., Chatsworth, CA.
Array Automated Assembly Task Low Cost Silicon Solar Array Project, Phase 2.
Annual Technical Report.
S. S. Rhee, G. T. Jones, and K. L. Allison. 1978, 187p NASA-CR-162174, DOE/JPL-954865-79/5
Contract JPL-954865
Subm-Sponsored by NASA Prepared for DOE and JPL.

Progress in the development of solar cells and module process steps for low-cost solar arrays is reported. Specific topics covered include: (1) a system to automatically measure solar cell electrical performance parameters; (2) automation of wafer surface preparation, printing, and plating; (3) laser inspection of mechanical defects of solar cells; and (4) a silicon antireflection coating system. Two solar cell process steps, laser trimming and holing automation and spray-on dopant junction formation, are described.

N79-31774/9 PC **A02**/MF **A01**
AeroChem Research Labs., Inc., Princeton, NJ.
Development of a Model and Computer Code to Describe Solar Grade Silicon Production Processes.
Quarterly Report.
R. Srivastava, and R. K. Gould. Aug 79, 19p NASA-CR-162160, AEROCHEM-TN-207
Contract JPL-954862
Subm-Sponsored by NASA and DOE Prepared for JPL.

The program aims at developing mathematical models and computer codes based on these models, which allow prediction of the product distribution in chemical reactors for converting gaseous silicon compounds to condensed-phase silicon. The major interest is in collecting silicon as a liquid on the reactor walls and other collection surfaces. Two reactor systems are of major interest, a SiCl4/Na reactor in which Si(l) is collected on the flow tube reactor walls and a reactor in which Si(l) droplets formed by the SiCl4/Na reaction are collected by a jet impingement method. During this quarter the following tasks were accomplished: (1) particle deposition routines were added to the boundary layer code; and (2) Si droplet sizes in SiCl4/Na reactors at temperatures below the dew point of Si are being calculated.

N79-31775/6 PC **A03**/MF **A01**
Crystal Systems, Inc., Salem, MA.
Silicon Ingot Casting: Heat Exchanger Method. Multi-Wire Slicing: Fixed Abrasive Slicing Technique, Phase 3.
Quarterly Progress Report, 1 Apr. - 30 Jun. 1979.
F. Schmid, and C. P. Khattak. Jun 79, 34p NASA-CR-162182, DOE/JPL-954373-79/11
Contract JPL-954373
Subm-Sponsored by NASA Prepared for DOE and JPL.

Ingot casting was scaled up to 16 cm by 16 cm square cross section size and ingots weighing up to 8.1 kg were cast. The high degree of crystallinity was maintained in the large ingot. For large sizes, the nonuniformity of heat treatment causes chipping of the surface of the ingot. Progress was made in the development of a uniform graded structure in the silica crucibles. The high speed slicer blade-head weight was reduced to 37 pounds, allowing surface speeds of up to 500 feet per minute. Slicing of 10 cm diameter workpieces at these speeds increased the through-put of the machine to 0.145 mm/min.

N79-31776/4 PC **A04**/MF **A01**
Honeywell Corporate Material Sciences Center, Bloomington, MN.
Silicon-on Ceramic Process: Silicon Sheet Growth and Device Development for the Large-Area Silicon Sheet and Cell Development Tasks of the Low-Cost Solar Array Project.
Quarterly Report, 2 Apr. - 29 Jun. 1979.
P. W. Chapman, J. D. Zook, J. D. Heaps, B. L. Grung, and B. Koepke. 31 Jul 79, 66p NASA-CR-162158, DOE/JPL-954356-79/2
Contracts NAS7-100, JPL-954356
Subm-Sponsored in Part by DOE Prepared for JPL.

The technical and economic feasibility of producing solar cell-quality silicon was investigated. This was done by coating one surface of carbonized ceramic substrates with a thin layer of large-grain polycrystalline silicon from the melt. Significant progress in the following areas was demonstrated: (1) fabricating a 10 sq cm cell having 9.9 percent conversion efficiency; (2) producing a 225 sq cm layer of sheet silicon; and (3) obtaining 100 microns thick coatings at pull speed of 0.15 cm/sec, although approximately 50 percent of the layer exhibited dendritic growth.

N79-31777/2 PC **A16**/MF **A01**
Union Carbide Corp., New York.
Low-Cost Solar Array Project. Feasibility of the Silane Process for Producing Semiconductor-Grade Silicon.
Final Report, Oct. 1975 - Mar. 1979.
Jun 79, 362p NASA-CR-162172
Contracts NAS7-100, JPL-954334
Subm-Prepared for JPL.

The feasibility of Union Carbide's silane process for commercial application was established. An integrated process design for an experimental process system development unit and a commercial facility were developed. The corresponding commercial plant economic performance was then estimated.

N79-31778/0 PC **A04**/MF **A01**
Clemson Univ., SC. Dept. of Electrical and Computer Engineering.
Engineering Area Investigation of Reliability Attributes and Accelerated Stress Factors on Terrestrial Solar Cells.
Quarterly Report, 9 Mar. - 1 Jul. 1979.
J. W. Lathrop, and J. L. Prince. 15 Jul 79, 57p NASA-CR-162165, DOE/JPL-954929-79/5

Results obtained include the definition of a simplified stress test schedule for terrestrial solar cells based on the work performed during the first program year, and the design and fabrication of improved jigs and fixtures for electrical measurement and stress testing. Implementation of these advanced techniques for accelerated stress testing is underway on three solar cell types. In addition, review of the literature on second quadrant phenomena was begun and some preliminary second-quadrant electrical measurements were performed. Results obtained at the first down time for 75 C B-T testing and biased and unbiased T-H pressure cooker testing of type F cells showed little or no degradation in electrical parameters. Significant physical effects (large solder bubbles) were noted for type F cells subjected to the pressure cooker stress test.

N79-31779/8 PC **A08**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Investigation of a Generator System for Generating Electrical Power, to Supply Directly to the Public Network, Using a Windmill.
C. Tromp. Aug 79, 159p NASA-TM-75497
Contract NASW-3199
Tran-Transl. Into English of "Onderzoek Aan een Generatorsystem voor Het Opwekken van, Direkt Aan Het Openbare Net Te Leveren, Elektrische Energie Net Behulp van een Windmolen" Delft Univ. Of Technol., Power Electron. Lab., Netherlands, May 1957 122 p. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif.

A windpowered generator system is described which uses a windmill to convert mechanical energy to electrical energy for a three phase (network) voltage of constant amplitude and frequency. The generator system controls the windmill by the number of revolutions so that the power drawn from the wind for a given wind velocity is maximum. A generator revolution which is proportional to wind velocity is achieved. The stator of the generator is linked directly to the network and a feed converter at the rotor takes care of constant voltage and frequency at the stator.

N79-31784/8 PC **A05**/MF **A01**
United Technologies Corp., South Windsor, CT. Power Systems Div.
Strip Cell Test and Evaluation Program.
Final Report, 15 Jun. 1976 - 30 Apr. 1977.
B. Gitlow, W. F. Bell, and R. E. Martin. 27 Oct 78, 76p NASA-CR-159652, FCR-0945
Contract NAS3-20042

The performance characteristics of alkaline fuel cells to be used for space power systems were

tested. Endurance tests were conducted on the cells during energy conversion operations. A feature of the cells fabricated and tested was the capability to evaporate the product water formed during the energy conversion reaction directly to space vacuum. A fuel cell powerplant incoporating these cells does not require a condenser and a hydrogen recirculating pump water separator to remove the product water. This simplified the fuel cell powerplant system, reduced the systems weight, and reduced the systems parasite power.

N79-31833/3 PC **A07**/MF **A01**
International Research and Development Co. Ltd., Newcastle (England).
Design Optimization of Solar Cell Interconnectors and Wiring for Low Orbit Spacecraft.
D. L. Kemp, D. Robson, C. Y. Marples, R. B. Evans, and P. F. Arthur. Nov 78, 129p IRD-78/36, ESA-CR(P)-1175
Contract ESA-2849/76-NL-HP(SC)

Theoretical models were developed to study the stress levels in silver plated molybdenum and silver mesh interconnectors which are currently used in solar arrays. A test rig was developed to measure the behavior of these interconnectors between room temperature and -170 C to enable the theoretical results to be verified. The models allow one end of an interconnector to be displaced and rotated in relation to the other and the resulting maximum induced stress of the interconnecor to be determined. Using the theoretical model a new optimized interconnector was designed within the constraints of the current operating conditions. The designed silver plated molybdenum interconnector was manufactured and tested. The fatigue results show a significant improvement in performance. Temperature effects were also studied.

ORAU/IEA-78-16(M) PC **A04**/MF **A01**
Institute for Energy Analysis, Oak Ridge, TN.
Rethinking the Scale of Coal-Fired Electric Generation: Technological and Institutional Considerations.
R. W. Gilmer, R. E. Meunier, and C. E. Whittle. Apr 78, 69p
Contract EY-76-C-05-0033

This paper examines the economic and social implications of an electric-utility system based on medium-scale (50 to 200 MWe) coal-fired plants dispersed near load centers. The historical trend in US electric generation has been a sustained effort to capture the economies of large scale. Technical and institutional conditions within the industry, as well as the historical perception of universal electrification as a desirable social goal, have brought about this trend. Large fossil and nuclear plants, often representing joint ventures of several utilities, dominate the plans of utilities over the next 20 years. Despite these trends, this review was unable to conclude that clear advantages must inherently accrue to either small- or large-scale electrical generation. Transportation and construction do offer demonstrable economies of scale, but the other terms in the cost equation (such as reliability and transmission) are sufficiently uncertain or site-specific to prevent firm conclusions concerning the effect of scale. Biases believed to exist in the regulatory process would dilute the utilities' perception of any advantages accruing to small generators; rate-of-return regulation favors overcapitalization as embodied in the construction of large plants and extensive transmission networks. It is not clear that the current regulatory structure is capable of weighing the institutional values of accountability and local control against dollar savings generally supposed to accrue to large plants. The Midwest and East North Central states may be singularly fit for a decentralized, medium-scale system for historical, geographical, and institutional reasons, as well as for their location near the coal fields. (ERA citation 04:048785)

ORNL/OEPA-9 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Potential Institutional Conflicts in the Implementation of the Resource Conservation and Recovery Act and Their Impacts on the Department of Energy: A Case Study.
S. Carnes, C. Tevepaugh, G. Young, and R. C. DeVault. Feb 79, 39p
Contract W-7405-ENG-26

Impacts of the Resource Conservation and Recovery Act (RCRA) of 1976 on two coal-fired generating plants and their operations were studied by reviewing relevant characteristics of the plants, their host communities, and their host states. The two plants, which are privately owned but whose power is committed to the DOE's Portsmouth Gaseous Diffusion Plant, are Clifty Creek Power Plant in Indiana and Kyger Creek Power Plant in Ohio. Assuming that ponding is an acceptable means of ash disposal, Clifty Creek should not be greatly impacted by RCRA unless local interests are concerned with the designation of the facility as a hazardous waste disposal site if ash is designated as hazardous by EPA. Kyger Creek may be impacted more due to marginally insufficient ponding capacity and an uncertain air pollution abatement future in Ohio (whether scrubbers will be required). The host communities are not likely to impose more stringent regulations and standards than EPA. Both of the host states are implementing RCRA but have insufficient resources to comply with mandated deadlines. It is quite likely that designation of hazardous waste facilities, generally, will invoke serious debate and possible opposition in host communities. Direct-combustion power plants, as a class, may be adversely affected by RCRA. Information flow to all coal users and waste generators must be assured to lessen the costs of compliance with RCRA. Smaller facilities and entities are likely to be more adversely impacted by RCRA than large installations and industries. (ERA citation 04:044930)

ORNL/TM-6811 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Effect of Florida's Water Law Modifications on Power Plant Siting.
C. S. Rosemarin. Jul 79, 39p
Contract W-7405-ENG-26

This study builds on a project which examined the water law of each of twenty-seven states in the eastern United States. The main purpose of the present work is to determine whether energy production facilities will have a legally sustainable right to available fresh water supplies in times of water shortage. Florida was selected for examination because a previous study identified parts of the state as regions which may encounter difficulties in providing water for energy production. In the early 1970s the Florida Legislature acted on the two components of this issue, water resource allocation and energy facility siting. The Florida Water Resources Act was based on a model law which was devised for Florida. The Act vested regulatory authority in the Florida Department of Environmental Regulation (DER) and five water management districts, into which it divided the state. It also established a system whereby most users must acquire a permit as a prerequisite to water use. Electric generation facilities were exempted from this requirement by the Florida Electrical Power Plant Siting Act. The purpose of this legislation is to implement a one-stop siting procedure for power plants. The governor and cabinet decide on final certification for a plant, but only after balancing the need for power against expected environmental impacts. Two significant problems were identified which indicate that power plants may not have a legally sustainable right to available fresh water supplies in times of shortage. First, almost no priority of use has been established among the various classes of permits as is required by the Water Resources Act. Consequently, some confusion remains in determining what will occur in the event of a drought. Second, it remains unclear whether the governor and cabinet, DER, or water management districts have authority to limit water use in times of water shortage. (ERA citation 04:049192)

RFP-2896 PC **A02**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Co-Sputtering of Aluminum--Silver Alloy Mirrors for Solar Reflectors.
R. O. Adams, C. W. Nordin, F. J. Fraikor, and K. D. Masterson. 1979, 12p CONF-790442-1
Contract EY-76-C-04-3533
International conference on metallurgical coatings, San Diego, CA, USA, 23 Apr 1979. Portions of this document are illegible.

Producing films of aluminium--silver alloys of various compositions for evaluation as solar reflectors is reported. The objective is to produce a substrate coated with aluminium and silver varying in composition from one end to the other. The films are characterized metallographically and compositionally, then the reflectivity and corrosion problems are determined. (ERA citation 04:049773)

SAN-1286-7 PC **A03**/MF **A01**
RCA Labs., Princeton, NJ.
Amorphous-Silicon Solar Cells. Quarterly Report No. 6, March 1--May 31, 1978.
D. E. Carlson. Jun 78, 48p
Contract EY-76-C-03-1286

Good agreement has been obtained between the photovoltaic characteristics of small-area, Schottky-barrier devices (1.45 mm exp 2) and large-area devices (2.2 cm exp 2). Short-circuit current densities of 6 mA/cm exp 2 have been observed for both areas with AMI illumination and no antireflection coatings. Laser scanning analysis has shown that good uniformity can be obtained in cells over 3 cm exp 2 in area. Ni--Si0 sub 2 cermets have been used as ballast resistance layers in a-Si:H p-i-n solar cells, and these cells can be cured by the application of a reverse bias. Several devices with as many as 22 series-connected cells have been fabricated on glass substrates, but the efficiencies of these large-area cells have been limited to $<1.8\%$ due primarily to large contact resistances. Diffusion studies have shown that the diffusion of dopants such as phosphorus and boron will not be a problem during device fabrication. Preliminary results indicate that large stresses in a-Si:H films can degrade the photovoltaic properties. Annealing studies have shown that a-Si:H films can tolerate temperatures as high as 430 exp 0 C for 30 min before serious degradation of the photovoltaic properties occurs. Schottky-barrier cells (no overcoatings) have been kept at 150 exp 0 C in air for eight months without degradation. However, a potential degradation mechanism that has been identified by compositional profiles is theinjection of OH exp - ions into a-Si:H in the vicinity of Schottky barriers. (ERA citation 04:049642)

SAN-1580-T1 PC **A02**/MF **A01**
Sperry Univac, St. Paul, MN. Defense Systems Div.
Cadmium Sulfide/Copper Ternary Heterojunction Cell Research. Technical Progress Quarterly Report, January 1, 1979--April 8, 1979.
1979, 15p
Contract EG-77-C-03-1580

The first quarter of work on a CdS/CuInSe cell research program is discussed. Efforts were directed toward fabricating CuInSe sub 2 films using rf sputtering, flash evaporation, and dual source, Se and CuInSe sub 2 , coevaporation to obtain p type films. Film electrical characteristics are discussed. Measurements of vapor stream composition using EIES and test strip depositions were conducted. An analysis cell grid design is presented. (ERA citation 04:048281)

SAN-1846-T1 PC **A02**/MF **A01**
Mobil Tyco Solar Energy Corp., Waltham, MA.
Preparation and Characterization of Hydrogenated Amorphous Silicon Thin Films and Thin Film Solar Cells Produced by Ion Plating Techniques. First Quarterly Progress Report, January 1, 1979--March 31, 1979.
30 Apr 79, 8p
Contract ET-78-C-03-1846

A review of the ion plating deposition process, in which evaporation of a metal or semiconductor into a glow discharge is used to affect the character and surface bonding of the resulting thin film, is given. It is noted that ion plating increases the adhesion in the substrate of implanted films compared to evaporated or sputtered films. This greater adhesion allows a greater choice of substrate materials, deposition rates approaching those produced by simple vacuum evaporation methods, and the option of doping. Experimental results of the effect of magnetic fields on film deposition rates can be more than doubled by application of a field of 12 tesla. Experiments to determine the electrical and physical properties of a-silicon produced in the magnetic field are underway. (ERA citation 04:049643)

SAND-78-1177 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.

Solar Thermal Test Facility Heliostat Development.
D. E. Arvizu. Jun 79, 30p CONF-7806153-1
Contract EY-76-C-04-0789
International symposium on concentrating solar collector technology, Albuquerque, NM, USA, 14 Jun 1978.

The STTF, which uses an array of 222 heliostats in a north field configuration, is capable of supplying 5 MWth energy onto a target on the tower. Data are being gathered from experience with this heliostat array at the STTF, which is currently a primary source of heliostat operational data. The STTF heliostat system is described, and performance data are discussed. (ERA citation 04:049660)

SAND-78-2181C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Status of the Photovoltaic Systems Definition Project.
K. L. Biringer, G. J. Jones, D. R. Smith, and H. N. Post. 1979, 5p CONF-790541-38
Contract EY-76-C-04-0789
International Solar Energy Society meeting, Atlanta, GA, USA, 28 May 1979.

Two of the areas of project responsibility, systems analysis and subsystem technology development, are discussed. The systems analysis task spans work in application analysis, systems design and optimization, and system cost and performance requirements. A summary of results of recently completed application analysis studies are given as well as discussions and references to other design guidelines available or in preparation. Within subsystem technology development are three subsystem categories. These include array subsystems, power conditioning and energy storage. Low cost structures work done as a part of array system technology are reviewed. Also present activities in power conditioning for photovoltaics are discussed. Activities in each of these areas include establishment of performance requirements, hardware development and evaluation testing. (ERA citation 04:048282)

SAND-78-2186C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Design of Photovoltaic Systems for Residential Applications in the United States.
G. J. Jones. 1979, 7p CONF-790457-3
Contract AC04-76DP00789
1979 photovoltaic solar energy conference, West Berlin, F.R. Germany, 23 Apr 1979.

Single family residences may represent one of the most promising future applications for photovoltaic systems. For this reason extensive analysis of potential systems for this sector was undertaken on a regional basis for the continental United States. Assuming installation in the period 1986 and beyond, this work considered numerous subsystem options, and a variety of operational modes and economic scenarios. Fifteen specific sites were analyzed, representing the different climatic conditions available in the continental United States. System rankings based on lifecycle cost effectiveness were obtained for each site by means of hourly modeling calculations using this inuput data. Results indicate that all-electric systems using high efficiency heat pump technology appear viable at nearly all sites. For thermal collector systems to be generally competitive, (either separate or combined thermal collectors), it was found that their installed system cost per square meter of collector area must approach that projected for the photovoltaic system. Systems which feed excess power back onto the utility grid were compared to those using on-site energy storage. For sell-back rates as low as one-half of the rate to the consumer, the battery system was found to be non-competitive, except at optimistic future price projections. (ERA citation 04:048283)

SAND-78-2187C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Status of the US Department of Energy Photovoltaic Concentrator Development Project.
B. D. Shafer, E. C. Boes, M. W. Edenburn, and D. G. Schueler. 1979, 8p CONF-790457-2
Contract AC04-76DP00789
1979 photovoltaic solar energy conference, West Berlin, F.R. Germany, 23 Apr 1979.

The overall objective of this project is to develop a photovoltaic concentrator technology which results in low-cost, long-life photovoltaic arrays at a price of less than $0.50 per peak watt by 1986. The general approach is to identify and develop those concentrator concepts which have the highest potential for low-cost and long-life by supporting technology and increasing solar array production capability. The principal criterion is to develop concentrating arrays that provide the lowest life cycle energy cost. The work that DOE is funding in the areas of concentrator cells, concentrator modules and complete arrays is surveyed. Highlights of work done to date in cell development include 18 to 20% efficient silicon cells and 28.5% efficient PV cell assemblies using GaAlAs and Si cells in conjunction with spectral splitting. In the area of concentrator modules a number of different types have been fabricated and evaluated. These include Fresnel lens modules, actively and passively cooled parabolic trough designs, and parabolic dish units. Full scale 10 kW arrays including a Fresnel lens design and a passively cooled off-axis parabolic trough design are being fabricated and tested. The results of evaluating these various designs in regard to their ability to produce cost effective energy will be presented. (ERA citation 04:048284)

SAND-79-0801 PC **A05**/MF **A01**
Sandia Labs., Albuquerque, NM.
Effect of Operating Temperature on the Cost of Energy from Solar Thermal Electric Power Plants.
L. L. Lukens. Jul 79, 88p
Contract EY-76-C-04-0789

The operating temperature of a solar thermal electric power plant controls the efficiency of the collector field, the efficiency of the power generation system and the cost of the thermal energy storage system. The effect of these three items, as temperature is varied, on the annualized cost of energy produced by the system is evaluated for both stand-alone solar and solar diesel hybrid power plants. The type of solar power plant considered is one using a linear focus distributed collector field and a Rankine cycle power generation system. Systems using different collector performance models, Rankine cycle working fluids and thermal energy storage concepts were included in the evaluation. (ERA citation 04:049658)

SAND-79-1126C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Design of Photovoltaic Systems for Intermediate-Sized Applications.
E. L. Burgess, and G. J. Jones. 1979, 7p CONF-790803-33
Contract EY-76-C-04-0789
14. intersociety energy conversion conference, Boston, MA, USA, 5 Aug 1979.

Several detailed design studies have been performed this past year for photovoltaic (PV) systems for intermediate load-center applications. The applications are representative of the commercial and industrial sectors. The designs have included total-energy systems, ac and dc loads, energy storage, utility feedback, and stand-alone configurations. The design techniques are reviewed, and resulting subsystem requirements are discussed. Three designs are discussed in detail to illustrate the use of the design techniques. Conclusions concerning future economic viability and technology development needs are presented. (ERA citation 04:048310)

SAND-79-1165C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Design and Performance of Silicon Solar Cells under Concentrated Sunlight.
H. T. Weaver, and R. D. Nasby. 1979, 4p CONF-790541-39
Contract EY-76-C-04-0789
International Solar Energy Society meeting, Atlanta, GA, USA, 28 May 1979.

Measurements and numerical calculations of performance of silicon solar cells, designed for operation under concentrated sunlight, are presented. Two design strategies are discussed and data from cells of each type are used for comparison with theory. The calculations ignore degeneracy and high doping effects but include Auger and trap recombination. Experimental base lifetimes are used for modeling. Agreement between calculations and experiment is within 5 to 10 percent. (ERA citation 04:048286)

SAND-79-1290C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
DOE Photovoltaic Concentrator Project.
D. G. Schueler, E. C. Boes, B. D. Shafer, and J. F. McDowell. 1979, 4p CONF-790541-36
Contract EY-76-C-04-0789
International Solar Energy Society meeting, Atlanta, GA, USA, 28 May 1979.

The three major task areas of the DOE Photovoltaic Concentrator Project, which are concentrator solar cell technology, solar concentrator technology, and concentrator array subsystems, are described. Progress is reported in concentrator cell development, including cell efficiency achievements and cell assembly and production processes. The development of efficient, low cost comentrators and concentrator manufacturing processes is discussed. A brief discussion of research in the design, fabrication and operation of full-size photovoltaic concentrator array is given and some test results are reported. (ERA citation 04:049645)

SERI/TP-34-180 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Alternate Cycles Applied to Ocean Thermal Energy Conversion.
B. Shelpuk, and A. Lewandowski. Feb 79, 14p CONF-790444-3
Contract EG-77-C-01-4042
Offshore technology conference, Houston, TX, USA, 30 Apr 1979.

Four open cycle OTEC concepts are described. These are: (1) single, vertical-axis turbine; (2) multiple, horizontal-axis turbines; (3) foam lift/hydraulic turbine; and (4) mist lift/hydraulic turbine. A preliminary assessment of achievable performance is made in addition to a description of the subsystem performance objectives which would support the achievement of the full potential inherent in these concepts. The results and conclusions of the paper include a description of the research objectives, achievement of which make open cycle OTEC a viable alternative as a nationl energy source. (ERA citation 04:048329)

SERI/TP-34-262 PC **A04**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Technical and Economic Assessment of Three Solar Conversion Technologies.
F. Kreith. 1979, 62p CONF-790732-1
Contract EG-77-C-01-4042
United Nations/economic commission for Europe siminar on cooperative technological forecasting; Solar Energy, Puerto De La Cruz, Tenerife, Canary Islands, Spain, 2 Jul 1979.

Photoelectric energy conversion, solar electric thermal conversion, and direct solar thermal conversion are examined from the point of view of technical and economic viability. The key conclusions of this examination are that all three of these solar thermal conversion technologies are technically viable today. However, only the direct solar thermal heat applications appear to be close to economically viability. If it is assumed that a lead time of approximately 25 years is required before a technical innovation can be placed on the market in a large scale, only direct applications of solar thermal energy, such as for heating water or providing industrial process heat, appear to have the potential of making major market penetration in this century. At the present time, the useful energy delivered from an industrial process heat system is within a factor of two of competing with systems using electric resistance heating or fossil fuel such as oil or coal. The technologies for direct application of solar thermal energy are mature and within technical and economical reach of mass production and installation. There exists no economically viable energy storage system compatible with industrial heat application temperatures, but a large penetration of the market appears feasible by designing solar systems that do not exceed the minimal load requirement of the industrial process and thereby utilize all available thermal energy directly. (ERA citation 04:048265)

SERI/TP-35-254 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.

Thermoelectric Ocean Thermal Energy Conversion.
T. S. Jayadev, D. K. Benson, and M. S. Bohn.
Jun 79, 33p CONF-790631-6
Contract EG-77-C-01-4042
OTEC conference, Washington, DC, USA, 19 Jun 1979.

A novel thermoelectric OTEC concept is proposed and compared with the ammonia closed-cycle designs. The thermoelectric OTEC is a much simpler system which uses no working fluid and therefore requires no pressure vessel, working fluid pumps, or turbogenerator. These components are replaced by power modules which are heat exchangers integrated with thermoelectric generators. The thermoelectric OTEC offers several potential advantages including: simpler and more easily mass-produced components; higher reliability system performance through the use of a high level of redundancy and long-lived, solid-state thermoelectric generators; greater safety for crew and environment by elimination of the pressurized working fluid; and the possibility of lower system costs. These comparisons are discussed and plans for future work are presented. (ERA citation 04:049706)

SERI/TP-35-263 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Giromill Overview.
R. D. McConnell. 1979, 14p CONF-790501-1
Contract EG-77-C-01-4042
Wind energy innovative systems conference, Colorado Springs, CO, USA, 23 May 1979.

The Giromill is a vertical axis wind turbine having straight airfoils whose angles of attack are controlled so as to maximize wind energy conversion. Each airfoil is rocked during a revolution in order to maintain a constant positive angle of attack over one half revolution and a constant negative value over the other half revolution. McDonnell Aircraft Company completed a feasibility study of the Giromill in 1976. Their initial work was followed by model tests in a wind tunnel in 1976 and 1977. Presently the Pump Division of Valley Industries, Inc., is cooperating with McDonnell Aircraft to design, build, and deliver a 40-kW (8.9-m/s) Giromill for the US Department of Energy. Delivery to Rocky Flats is scheduled for the end of 1979. In addition to describing the above work, an evaluation of the Giromill concept in terms of some wind energy rules-of-thumb is presented. (ERA citation 04:048512)

SERI/TR-35-225 PC **A03**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Summary of Currently Used Wind Turbine Performance Prediction Computer Codes.
F. Perkins. May 79, 29p
Contract EG-77-C-01-4042

Informaion on currently used wind turbine aerodynamic/economic performance prediction codes is compiled and presented. Areas of interest to wind energy researchers that are not included in the reported codes are identified. Areas which are weak in experimental support are also identified. (ERA citation 04:049843)

TID-28842(Dr) PC **A03**/MF **A01**
Department of Energy, Washington, DC.
Commercialization Strategy Report for Photovoltaic Systems.
F. H. Morse, M. Card, R. Lewis, P. Maycock, and E. Smith. 40p

The commercialization readiness of photovoltaics is discussed including technical readiness, market/economic readiness, environmental readiness, institutional readiness, and benefits analysis. Possible government actions addressing the barriers to market development are described. Two generic commericalization strategies for achieving DOE array price and production volume goals are outlined. (ERA citation 04:048303)

10C. Energy Storage

AD-A073 856/7 PC **A05**/MF **A01**
Eagle-Picher Industries Inc Joplin MO Couples Dept
Improved Thermal Battery Performance.
Final rept. Jun 76-Feb 79,
James A. DeGruson. Jun 79, 80p AFAPL-TR-79-2042
Contract F33615-76-C-2074

A thermal battery was developed which demonstrated an energy density in excess of 17 watt-hours per pound. This advancement of approximately three times the energy density of thermal batteries was accomplished with the lithium aluminum iron disulfide system. The technology necessary to manufacture a thermal battery which will produce 28 volts at 30 amperes for 30 minutes has been achieved. (Author)

AD-A073 991/2 Not available NTIS
Florida Univ Gainesville Dept of Chemistry
Some Redox Reactions on Semiconducting Tin Oxide Electrodes in Molten LiCl-KCl Eutectic at 450 C,
H. A. Laitinen, I. Uchida, and K. Niki. 28 Jun 78, 6p ARO-12551.5-C
Grant DAAG29-75-G-0092
Prepared in cooperation with Tohoku Univ., Sendai (Japan). Dept. of Applied Chemistry and Yokohama National Univ. (Japan). Dept. of Electrochemistry.
Availability: Pub. in Jnl. of the Electrochemical Society: Electrochemical Science and Technology, v125 n11 p1759-1764 Nov 78 (No copies furnished by DDC).

No abstract available.

COO-5162-5 PC **A02**/MF **A01**
Ceramatic, Inc., Salt Lake City, UT.
Fabrication and Characterization of NASICON Ceramic Electrolytes. Monthly Technical Progress Report, February 1--February 28, 1979.
R. S. Gordon. 28 Feb 79, 20p
Contract EC-78-C-01-5162

Additional samples of NASICON formed from mechanically mixed powders were formed and sintered to adequate mass density. For such mechanical mixtures, sintered densities were determined as a function of sintering temperature and time. In these studies, particle size distributions were measured to ensure relatively constant powder characteristics. A few preliminary closed one end tubes of polycrystalline NASICON were fabricated, but they have not passed the Ceramatec quality control specifications. NASICON samples are now being tested in a static sodium bath at 400 exp 0 C. In addition, negotiations with Ford Aerospace and Communications Corporation and the General Electric Research and Development Laboratory were completed to set the size of tubes to be delivered for the testing of NASICON electrolyte tubes in sodium--sulfur cells. 11 figures, 4 tables. (ERA citation 04:050145)

DOE/NASA/1044-79/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Effect of Positive Pulse Charge Waveforms on Cycle Life of Nickel--Zinc Cells.
J. J. Smithrick. Jul 79, 15p NASA-TM-79215
Contract EC-77-A-31-1044

Five-amp-hour nickel--zinc cells were life cycled to evaluate four different charge methods. Three of the four waveforms investigated were 120-Hz full-wave-rectified sinusoidal (FWRS), 120-Hz silicon-controlled rectified (SCR), and 1-kHz square-wave (SW). The fourth, a constant-current method, was used as a baseline of comparison. Three sealed Ni--Zn cells connected in series were cycled. Each series string was charged at an average C/20 rate, and discharged at a C/2.5 rate to a 75% rated depth. Results indicate that the relatively inexpensive 120-Hz FWRS charger appears feasible for charging 5-Ah nickel--zinc cells with no significant loss in average cycle life when compared to constant current charging. The 1-kHz SW charger could also be used with no significant loss in average cycle life. This result suggests the possibility of utilizing the existing electric vehicle chopper controller circuitry for an on-board charger. There was an apparent difference with the 120-Hz SCR charger as compared to the others; however, this difference could be due to an inadvertent severe overcharge, which occurred prior to cell failure. The remaining two positive-pulse-charging waveforms, FWRS and 1 kHz, did not improve the cycle life of 5-Ah nickel--zinc cells over that of constant-current charging. 10 figures, 2 tables. (ERA citation 04:048732)

N79-31350/8 PC **A06**/MF **A01**
Celanese Research Co., Summit, NJ.
Ultrafine Polybenzimidazole (PBI) Fibers.
Final Report, Jun. 1976 - Jun. 1979.
E. C. Chenevey. Jun 79, 119p NASA-CR-159644
Contract NAS3-20040

Mats were made from ultrafine polybenzimidazole (PBI) fibers to provide an alternate to the use of asbestos as separators in fuel cells and alkaline batteries. To minimize distortion during mat drying, a process to provide a dry fibrid was developed. Two fibrid types were developed: one coarse, making mats for battery separators; the other fine, making low permeability matrices for fuel cells. Eventually, it was demonstrated that suitable mat fabrication techniques yielded fuel cell separators from the coarser alkaline battery fibrids. The stability of PBI mats to 45% KOH at 123 C can be increased by heat treatment at high temperatures. Weight loss data to 1000 hours exposure show the alkali resistance of the mats to be superior to that of asbestos.

N79-31370/6 PC **A09**/MF **A01**
Societe des Accumulateurs Fixes et de Traction, Romainville (France). Dept. Accumulaters.
Definition de l'Impregnation Electrochimique des Electrodes de Nickel (The Definition of the Process of Electro-Chemical Impregnation of Nickel Electrodes).
Final Report.
P. Antoine. 1978, 176p DI/SAS-112/78-PA/CM, ESA-CR(P)-1182
Contract ESTEC-3000/76-NL-HP(SC)
Language in French.

Electrochemical impregnation was studied during a series of experiments designed to define the optimal conditions for the fabrication of dimensionally stable cell anodes of Ni-H2 and Ni-Cd systems. The influence of various parameters, such as current and duration of electrolysis, temperature and acidity of the chemical bath, the concentrations of Ni and Co as well as the use of ethanol, was determined. Results show that the electrochemical impregnation process as defined is industrially feasible and it is suggested that Ni-H2 and Ni-Cd type electrodes be produced in sufficient quantity to further evaluate their performance characteristics.

N79-31520/6 PC **A05**/MF **A01**
British Aerospace Dynamics (Space), Stevenage (England).
The Circuits Design of a Satellite Battery Discharge Regulator Using the Limit Cycle Conductance Controller.
Final Report.
P. J. Higgins. Mar 79, 86p TP-7725, ESA-CR(P)-1223
Contract ESA-3376/77-NL-HP

The design of a battery discharge regulator (BDR) module incorporating the principle of limit cycle conduction control is described. The design aim was to produce an improved BDR module compatible with the European Communications Satellite (ECS) power system. A complete design is presented here with circuit diagrams, parts lists, and test results. Due account was taken of parts derating and reliability considerations as befitting a flight standard design. During the design process the principle advantages of limit cycle conduction control were confirmed and some disadvantages were discovered. While not meeting all requirements of the target specification, the result is a working BDR module having similar performance to the ECS circuit, but with nominally twice the power handling capability for a given mass.

N79-31781/4 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Discharge Characteristics of 300 Ampere-Hour Ni-Zn Traction Cells.
J. G. Ewashinka. Aug 79, 11p NASA-TM-79244, E-151

Preliminary tests were performed on 300 amphere-hour nickel-zinc cells containing the Lewis improved inorganic-organic (I/O) separator. These

cells also have other design features included to optimize performance and cycle life. The tests carried out were formation tests and characteristic discharge tests. Information obtained include case temperature and maximum power delivered.

N79-31834/1 PC **A17**/MF **A01**
Societe des Accumulateurs Fixes et de Traction, Romainville (France). Dept. Accumulateurs.
Report on the Development of Silver Hydrogen Batteries Developpement de l'Argent Hydrogene.
Final Report.
P. Antoine. Jan 79, 382p DI/SAS-061/79-PA/MLC, ESA-CR(P)-1213
Contract ESTEC-2994/76
Language in French.

The feasibility of silver hydrogen batteries was experimentally studied in order to identify specific problems relative to the construction of this type of battery, given the constraints that the device should have a mass to energy ratio of 80 Whr/kg and a service life comparable to Ni-Cd and Ni-H2 systems. Ten different design prototypes were built and their characteristics are given. The evaluation of the prototypes involved electrical cycles typically encountered on board satellites situated in low altitude or geostationary orbits. Problems specific to silver electrodes were studied as they effectively determine the mass to energy ratio of the system. Results permit a practical estimation to be made of the mass to energy ratio of the Ag-H2 system while identifying an optimal Ag electrode.

ORNL/TM-6934 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Low-Temperature Thermal Energy Storage Program Annual Operating Plan.
D. M. Eissenberg, and H. W. Hoffman. Aug 79, 68p
Contract W-7405-ENG-26

The Low-Temperature Thermal Energy Storage (LTTES) Program operating plans for FY 1979 are described in terms of general program objectives and the technical activities being implemented to achieve these objectives. The program structure provides emphasis on several principal thrusts; namely, seasonal thermal storage, daily/short-term thermal storage, and recovery and reuse of waste heat. Fiscal data are summarized according to thrust area, individual efforts, and funding source. (ERA citation 04:050142)

SAND-79-1127C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Batteries for Specific Solar Applications.
R. P. Clark. 16 May 79, 11p CONF-790595-1
Contract EY-76-C-04-0789
DOE semi-annual review for photovoltaics, Gatlinburg, TN, USA, 16 May 1979.

This program currently consists of three projects: a Battery/Photovoltaic Handbook being prepared by Bechtel Corporation, a Solar Data Base and Systems Study by Hittman Associates, and Sandia's Battery Systems for Photovoltaic Energy Storage. The program is outlined. (ERA citation 04:049644)

UCRL-50056-78 PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Mechanical Energy Storage Technology Project: Annual Report 1978.
T. M. Barlow, W. T. Crothers, S. V. Kulkarni, and J. A. Rinde. 26 May 79, 61p
Contract W-7405-ENG-48

The objectives of the Mechanical Energy Storage Technology (MEST) Project at Lawrence Livermore Laboratory (LLL) are to develop and evaluate MEST and to demonstrate its potential for energy savings in vehicular and stationary systems. Primary emphasis is on flywheel energy-storage systems; other applicable concepts are also considered. The activities reported include: (1) MEST application to electric and hybrid vehicles; (2) MEST application to heat engine vehicles; (3) fiber composite materials characterization; and (4) flywheel rotor technology development. (ERA citation 04:050291)

UCRL-52773(V.2) PC **A05**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Assessment of the Applicability of Mechanical Energy Storage Devices to Electric and Hybrid Vehicles. Volume II.
M. W. Schwartz. 1 May 79, 85p
Contract W-7405-ENG-48

The study assesses the ability of mechanical energy storage devices to offer improvements in the performance of electric vehicles. The power and energy required in a storage device to realize specific improvements upon current and near-term electric vehicle performance specifications are calculated. Candidate mechanical energy storage devices are reviewed. It is concluded that only flywheels and, for some applications, hydraulic accumulators are practical in this context. With respect to each performance specification, data are presented on the vehicle mass fraction of the mechanical energy storage system as a function of its specific energy and the overall vehicle mass. The study indicates that mechanical energy storage devices may or may not improve range, depending on the particular configuration of the vehicle and the driving cycle. (ERA citation 04:050292)

11. MATERIALS

11A. Adhesives and Seals

N79-31602/2 PC **A03**/MF **A01**
Pratt and Whitney Aircraft Group, East Hartford, CT. Commercial Products Div.
Development of a Plasma Sprayed Ceramic Gas Path Seal for High Pressure Turbine Applications.
Final Report, 12 Sep. 1978 - 12 Apr. 1979.
L. T. Shiembob, and J. F. Hyland. Sep 79, 43p
NASA-CR-159669, PWA-5633-11
Contract NAS3-21390

Development of the plasma sprayed graded, layered ZrO2/CoCrAlY seal system for gas turbine engine blade tip seal application up to 1589 K (2400 F) surface temperature was continued. Methods of improvement of the cyclic thermal shock resistance of the sprayed zirconia seal system were investigated. The most promising method, reduction of the ceramic thickness and metallic substrate stiffness were selected based upon potential and feasibility. Specimens were fabricated and experimentally evaluated to: (1) substantiate the capacity of the geometry changes to reduce operating stresses in the sprayed structure; and (2) define the abradability, erosion, thermal shock and physical property characteristic for the sprayed ceramic seal system. Thermal stress analysis was performed and correlated with thermal shock test results.

11B. Ceramics, Refractories, and Glasses

AD-A074 181/9 PC **A03**/MF **A01**
Westinghouse Research and Development Center Pittsburgh PA
Monolithic Transformation of Ceramic Materials from Metal-Organic Sols and Gels.
Final rept. 1 Jul 77-30 Jun 79,
B. E. Yoldas, D. P. Partlow, and D. M. Mattox. 20 Jul 79, 44p ARO-13970.1-MS
Contract DAAG29-77-C-0029

The process used to form monolithic transparent Al2O3 bodies from metal-organic starting materials at low temperature via the gel process involves essentially four steps: hydrolysis, peptization, gel formation, and pyrolysis. Each step has been systematically investigated by modification of associated variables in order to determine the combination of factors which produces optimum results. It has been found that the interparticle distance, that is, the extent of approach attained by colloidal particles, at the point of gelling is of critical importance in maintaining monolithicity during the gel-oxide conversion. Minimization of this distance not only reduces the amount of shrinkage necessary during liberation of organics, allowing the body to remain in one piece, but also appears to allow interparticle bond formation during drying and pyrolysis, possibly involving hydroxyl and alkyl groups. For this reason, the factors that provide for the closest approach of gel particles were given particular attention in this investigation. (Author)

GA-A-15291 PC **A05**/MF **A01**
General Atomic Co., San Diego, CA.
Round Robin Optical Measurements of Preferred Orientation in Nearly Isotropic Pyrocarbon.
D. W. Stevens. Jun 79, 100p
Contract EY-76-C-03-0167-061

The results of round robin optical measurements of preferred orientation in pyrocarbon were obtained from seven laboratories (participants). The data were obtained from samples transferred from participant to participant in conventional round robin fashion. Straight lines were fit to this data from each participant pair, and a seven-dimensional hyperline fit was made through the data common to all seven participants. The correlations between participant pairs suggest significantly different degrees of mutual correlation for different participants. The data from some participants are shown to correlate significantly better with the rest of the data than data from other participants. The significance of these results for the high-temperature gas-cooled reactor is discussed. (ERA citation 04:050380)

GA-A-15333 PC **A04**/MF **A01**
General Atomic Co., San Diego, CA.
Recommendation of a Triaxial Failure Theory for Graphite.
P. Y. Tang. May 79, 54p
Contract EY-76-C-03-0167-061

An extensive literature search has been conducted on the application of triaxial failure theories to an anisotropic brittle solid. This study leads to the conclusion that the strength tensor theory of Tsai and Wu appears most promising for HTGR structural graphites. The reduction of this theory to model the transversely isotropic nature of HTGR structural graphites is presented. The extensions to the ongoing biaxial stress experimental program, needed to provide the additional data required to verify this theory, are defined. (ERA citation 04:050318)

LBL-9257 PC **A04**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Microstructure, Sintering and Strength of Polycrystalline SiC.
M. F. Sung. Jun 79, 68p
Contract W-7405-ENG-48
Thesis.

SiC, an attractive candidate as a high temperature material, sintered with additions of 1% boron and 1% carbon could reach the theoretical density. The roles of these dopants and related sintering mechanism are controversal, but detailed characterization, both physical and spectroscopic has lead to a new model in this work, suggesting that boron and carbon form a boundary phase which is the diffusion path during sintering. The investigation has been done by applying different techniques. No detectable boron segregation was found, and no convincing evidence showing the existence of boundary phase could be obtained. The results thus indicate that SiC is solid-state sintered, no glassy phase exists, and it is not intrinsically unsinterable. The mechanical strength vs temperature behavior has also been investigated. The different behavior between two sets of samples is due to the different microstructure which is probably due to the difference in the impurity (Al) content. (ERA citation 04:050345)

UCRL-82360 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Feasibility of Glass Processing by Precision Machine Technology.
G. M. Sanger, and P. C. Baker. Aug 79, 12p
CONF-790510-3
Contract W-7405-ENG-48
SPIE electro-optical technical symposium and workshop, Huntsville, AL, USA, 22 May 1979.

As early as 1927, methods of rendering glass and glassy materials more susceptible to mechanical destruction have been investigated. Considerable

literature was published in the fields of diamond drilling, the scribing and identing of glass as well as other nonmetallic materials. Little significant progress has been made in either determining the conditions under which this can be accomplished or any sound description of the underlying mechanisms. This literature led some months ago, to attempt to apply these concepts to the possibility of applying precision machine technology and diamond turning to processing glass used in optical applications. Initial findings indicate that material can be removed from glass components without large tool wear, and that experiments relating surface character to machine parameters reveal near theoretical surfaces in the machined area. Criteria for determining what constitutes a machined optical quality or easily polished surface is described. Experimental results relating machined surface character to machine parameters are presented. (ERA citation 04:050378)

11C. Coating, Colorants, and Finishes

AD-A073 931/8 Not available NTIS
Texas Tech Univ Lubbock Dept of Chemistry
Picosecond Fluorescence Studies of Xanthene Dyes.
G. R. Fleming, A. W. E. Knight, J. M. Morris, R. J. S. Morrison, and G. W. Robinson. 11 Nov 76, 6p ARO-14470.4-C
Contract DAAG29-76-G-0289, DAAG29-77-G-0028
Availability: Pub. in Jnl. of American Chemical Society, v99 n13 p4306-4311, 22 Jun 77. (No copies furnished by DDC).

No abstract available.

CONF-790570-1 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Stability of Plasma-Sprayed Coatings Tested at White Sands Solar Facility.
J. M. Schreyer, R. A. Hays, C. R. Schmitt, and D. Farwell. 1979, 9p CONF-790541-10
Contract W-7405-ENG-26
Solar Thermal Test Facility Users Association experiments workshop, Albuquerque, NM, USA, 3 May 1979.

Plasma-sprayed coatings on steel plates were tested at the White Sands Solar Facility at temperatures from 200 exp 0 C to 1000 exp 0 C. Analysis of the specimens before and after testing showed erbium dodecaboride (ErB sub 12), yttrium hexaboride (YB sub 6), titanium diboride (TiB sub 2), and chromium oxide (Cr sub 2 O sub 3) to be stable above 600 exp 0 C. A heat balance on the water-cooled specimens of these coatings showed 73% to 97% heat recovery efficiency. (ERA citation 04:048455)

N79-31835/8 PC **A06**/MF **A01**
Office National d'Etudes et de Recherches Aerospatiales, Toulouse (France). Dept. d'Etudes et de Recherches en Technologie Spatiale.
Mise au Point de Materiaux Combinant la Qualite de Reflecteur Solaire et Une Bonne Conductibility Electrique, Tome 2 (On the Development of a Material which Is Both a Solar Reflector and a Good Electric Conductor).
Final Report.
A. Paillous, and D. Sarrail. Feb 79, 121p ONERA-CERT-4064, ESA-CR(P)-1214
Contract ESTEC-3184/N477-HP(SC)
Language in French.

The fabrication and characteristics of solar reflector second surface mirrors (SSM) on Teflon covered by transparent electrically conductive layers are described. The use of an electrically conductive polymeric film for SSM's is also studied. For both types of material the solar absorptivity versus emitter characteristics is examined. In order to determine the rate of degradation in the optical properties of the multilayer surfaces studied, a space environment solar radiation simulation test involving exposure to ultraviolet irradiation for approximately 1000 solar equivalent hours was devised. Results show the Teflon surface performs better given these test conditions. However, suggestions for improving the polymeric surface are made and it is supposed that it is potentially as good as the Teflon.

SAN-2156-T1 PC **A03**/MF **A01**
Airco Temescal Div., Berkeley, CA.
Development of Improved Corrosion and Erosion Resistance Coatings for Gas Turbine Airfoils. Technical Progress Report, September 1, 1978--March 30, 1979.
S. Shen. 1978, 37p
Contract ET-78-C-03-2156

Progress in developing improved hot corrosion- and erosion-resistant coatings for industrial/utility gas turbine engine airfoils is reported. Both metallic coatings of the CoCrAl type with various elements addition and ceramic coating of ZrO sub 2 (12% Y sub 2 O sub 3) will be evaluated in a single source evaporation PVD system. (ERA citation 04:050282)

11D. Composite Materials

AD-A073 899/7 PC **A03**/MF **A01**
Washington Univ St Louis MO Materials Research Lab
Fatigue Failure of Composite Laminates.
Interim rept. May 77-Apr 78,
Nhan Q. Nguyen, and J. L. Kardos. Apr 79, 36p AFML-TR-79-4035
Contract F33615-77-C-5053

This program is to provide fatigue data on a graphite-epoxy composite. AS/3501-5A was selected as the test material. Unidirectional composites with 0 and 90 degree ply orientations were tested. Both static and fatigue strength were measured. Multidirectional laminates with + or - 45 and 02/90/+ or - 45 ply orientations were also tested. The fatigue data were analyzed using Weibull parameters. The frequency of testing was kept low in order to limit the temperature use below 5 C. More extensive data will be generated and analyzed under this contract. (Author)

AD-A074 125/6 PC **A03**/MF **A01**
Oklahoma Univ Norman School of Aerospace Mechanical and Nuclear Engineering
Classical Analyses of Laminated Bimodulus Composite-Material Plates.
Technical rept.,
Charles W. Bert. Aug 79, 42p Rept nos. OU-AMNE-79-10A, TR-4A
Contract N00014-78-C-0647
Supersedes report dated Jul 79, AD-A072 276.

A differential-equation formulation is presented for the equations governing the small-deflection elastic behavior of thin plates laminated of anisotropic bimodulus materials (which have different elastic stiffnesses depending upon the sign of the fiber-direction strains). As a basis for comparative evaluation of a finite-element formulation presented in Technical Report No. 3 of the contract, exact closed-form solutions are presented for two cross-ply-laminated plate problems: (1) a freely supported rectangular plate subjected to a sinusoidally distributed normal pressure, and (2) a fully clamped elliptic plate subjected to uniform normal pressure. For the special case of isotropic bimodulus material, simplified approximate solutions are deduced from the exact ones. Good agreement is obtained among the two solutions presented here, as well as with numberical results existing in the literature for special cases and with the finite-element results. Also, for the first time is presented a closed-form solution for a rectangular plate arbitrarily laminated of anisotropic ordinary (not bimodulus) material.

AD-A074 184/3 PC **A02**/MF **A01**
Oklahoma Univ Norman School of Aerospace Mechanical and Nuclear Engineering
Finite-Element Analysis of Laminated Bimodulus Composite-Material Plates.
Technical rept.,
J. N. Reddy, and W. C. Chao. Aug 79, 25p Rept nos. OU-AMNE-79-18, TR-7
Contract N00014-78-C-0647
See also AD-A071 390.

Finite-element analysis of the equations governing the small-deflection elastic behavior of thin plates laminated of anisotropic bimodulus materials (which have different elastic stiffnesses depending upon the sign of the fiber-direction strain) is presented. Single-layer and two-layer cross-ply, simply-supported rectangular plates subjected to sinusoidally distributed normal pressure and uniformly distributed normal pressure are analyzed. For the sinusoidally loaded case, the finite-element solutions are gratifyingly close to the exact closed-form solutions. (Author)

AD-A074 236/1 PC **A03**/MF **A01**
Oklahoma Univ Norman School of Aerospace Mechanical and Nuclear Engineering
A Penalty Plate-Bending Element for the Analysis of Laminated Anisotropic Composite Plates.
Technical rept.,
J. N. Reddy. Aug 79, 37p Rept nos. OU-AMNE-79-14, TR-6
Contract N00014-78-C-0647

A C degrees (penalty) finite element is developed for the equations governing the heterogeneous laminated plate theory of Yang, Norris and Stavsky. The YNS theory is a generalization of Mindlin's theory for homogeneous, isotropic plates to arbitrarily laminated anisotropic plates and includes shear deformation and rotary inertia effects. The present element can also be used in the analysis of thin plates by appropriately specifying the penalty parameter. A variety of problems are solved, including those for which solutions are not available in the literature, to show the material effects and the parametric effects of plate aspect ratio, length-to-thickness ratio, lamination scheme, number of layers and lamination angle on the deflections, stresses, and vibration frequencies. Despite its simplicity, the present element gives very accurate results. (Author)

AD-A074 336/9 PC **A03**/MF **A01**
Stanford Univ CA Div of Applied Mechanics
Steady-State Point-Source Excitation of a Laminated Composite.
Interim rept.,
G. S. Beaupre, and G. Herrmann. Jun 79, 26p Rept no. SUDAM-79-3
Contract N00014-76-C-0054

Steady-state periodic excitation at a point of an extended periodically laminated elastic composite is considered in anti-plane strain. The curves of constant phase are determined in the geometric optics approximation. The associated distribution of group velocity is also calculated. (Author)

N79-31349/0 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Evaluation of Silicon Carbide Fiber/Titanium Composites.
R. W. Jech, and R. A. Signorelli. Jul 79, 28p NASA-TM-79232, E-134

Izod impact, tensile, and modulus of elasticity were determined for silicon carbide fiber/titanium composites to evaluate their potential usefulness as substitutes for titanium alloys or stainless steel in stiffness critical applications for aircraft turbine engines. Variations in processing conditions and matrix ductility were examined to produce composites having good impact strength in both the as-fabricated condition and after air exposure at elevated temperature. The impact strengths of composites containing 36 volume percent silicon carbide (SiC) fiber in an unalloyed (A-40) titanium matrix were found to be equal to unreinforced titanium-6 aluminum-4 vanadium alloy; the tensile strengths of the composites were marginally better than the unreinforced unalloyed (A-70) matrix at elevated temperature, though not at room temperature. At room temperature the modulus of elasticity of the composites was 48 percent higher than titanium or its alloys and 40 percent higher than that of stainless steel.

N79-31351/6 PC **A04**/MF **A01**
Georgia Inst. of Tech., Atlanta.
Comparative Evaluation of Woven Graphite-Epoxy Composites.
Final Report.
S. Hanagud, A. Tayebi, R. G. Clinton, Jr., and B. M. Nayak. Jul 79, 60p NASA-CR-159101, E-16-604
Grant NSG-1352

A comparative evaluation of some of the mechanical properties of woven graphite-epoxy compos-

ites are discussed. In particular, the types of weaves and the resin contents were chosen for comparison. The types of weaves selected are plain weave, satin weave, and tridirectional weave. The composites made of the fabrics are compared to composites made from unidirectional tapes under static and fatigue loading. During static loading, acoustic emission events were monitored. Also, examinations of fracture surfaces and polished sections both away from the fracture surface, and of virgin specimens under an electron microscope are discussed.

N79-31352/4 PC **A04**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Coll. of Engineering.
Environmental Effects on Advanced Composites.
Final Progress Report, 1 Aug. 1978 - 31 Jul. 1979.
J. Unnam, C. R. Houska, and S. V. N. Naidu. Aug 79, 58p NASA-CR-162280
Grant NSG-1531

The development of titanium matrix composites for elevated temperature applications was investigated. General solutions for treating diffusion in multiphase multicomponent systems were studied. Graphite polyimide composites were characterized with respect to mechanical property degradation by moisture.

N79-31353/2 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Thermal Expansion and Swelling of Cured Epoxy Resin Used in Graphite/Epoxy Composite.
M. J. Adamson. Sep 79, 35p NASA-TM-78610, A-7919

The thermal expansion and swelling of resin material as influenced by variations in temperature during moisture absorption is discussed. Comparison measurements using composites constructed of graphite fibers and each of two epoxy resin matrices are included. Polymer theory relative to these findings is discussed and modifications are proposed.

N79-31627/9 PC **A04**/MF **A01**
Lehigh Univ., Bethlehem, PA. Inst. of Fracture and Solid Mechanics.
Normal and Radial Impact of Composites with Embedded Penny-Shaped Cracks.
Interim Report.
G. C. Sih. Feb 79, 54p NASA-CR-159538, IFSM-79-99
Grant NSG-3179

A method is developed for the dynamic stress analysis of a layered composite containing an embedded penny-shaped crack and subjected to normal and radial impact. The material properties of the layers are chosen such that the crack lies in a layer of matrix material while the surrounding material possesses the average elastic properties of a two-phase medium consisting of a large number of fibers embedded in the matrix. Quantitatively, the time-dependent stresses near the crack border can be described by the dynamic stress intensity factors. Their magnitude depends on time, on the material properties of the composite and on the relative size of the crack compared to the composite local geometry. Results obtained show that, for the same material properties and geometry of the composite, the dynamic stress intensity factors for an embedded (penny-shaped) crack reach their peak values within a shorter period of time and with a lower magnitude than the corresponding dynamic stress intensity factors for a through-crack.

11E. Fibers and Textiles

AD-A074 142/1 PC **A02**/MF **A01**
Defence Research Establishment Ottawa (Ontario)
An Apparatus for the Measurement of the Water-Vapour Permeability of Textiles.
Technical note,
Brian Farnworth. Jun 79, 17p Rept no. DREO-TN-79-1
Abstract in French.

An apparatus has been constructed to measure the water vapour resistance of textiles, in particular those such as battings and piles that are highly air permeable and have low vapour resistances. The technique has been tested by measuring the water vapour resistance of air gaps in the range 1 to 8 mm thickness. No systematic errors were observed with a random error in the resistance measurement equivalent to 0.5 mm of still air. (Author)

11F. Metallurgy and Metallography

AD-A073 835/1 PC **A03**/MF **A01**
Southwest Research Inst San Antonio TX
Crack Tip Plasticity Associated with Corrosion Assisted Fatigue.
Interim rept. Jun 78-Jun 79,
D. L. Davidson, and J. Lankford. 31 May 79, 36p
Contract N00014-75-C-1038

A newly developed technique for measuring in-plane crack tip displacements and strains has been applied to the ongoing study of the effect of a water vapor environment on fatigue crack propagation in low-carbon steel. This stereoimaging technique allows the determination of the in-plane displacements with both high resolution and accuracy at numerous points in the near crack tip region. From these displacements the in-plane elements of the strain tensor and the principal strains and shear strains may be calculated. The principal effect of a water vapor environment on crack tip plasticity is that it causes a decrease in strain magnitude which the material at the crack tip supports, corroborating previous results derived from the measurement of subgrain size distribution. Information on the effect of environment on crack opening loads and on the 'compressive displacements' at the tip of the unloaded crack are also given, as are some preliminary results on the interrelationships between loading frequency, environment and crack propagation rate. (Author)

AD-A073 845/0 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Scientific Research Institute of Aviation Materials (Selected Articles).
22 Jan 79, 25p Rept no. FTD-ID(RS)T-2371-78
Edited trans. of Struktura i Svoystva Titanovykh Silavov (USSR) p11-16; 33-37 1972, by Carol S. Nack.

No abstract available.

AD-A073 948/2 Not available NTIS
Southwest Research Inst San Antonio TX
An Anisotropic Screening Effect in the Theory of Electric Field Gradients in Dilute Alloys of Simple Metals,
R. E. Beissner. 1 Jun 78, 3p ARO-13061.2-P
Contract DAAG29-76-C-0031
Availability: Pub. in Physics Letters, v71A n1 p109-111, 16 Apr 79. (No copies furnished by DDC).

No abstract available.

AD-A074 005/0 Not available NTIS
Wisconsin Univ-Madison Dept of Metallurgical and Mineral Engineering
Undercooling of Low-Melting Metals and Alloys,
J. H. Perepezko, D. H. Rasmussen, I. E. Anderson, and C. R. Loper, Jr. 1977, 8p
Grants DAAG29-76-G-0316, DAAG29-78-G-0157
Availability: Pub. in Solidification and Casting of Metals, Proceedings of an International Conference on Solidification held at Sheffield Univ. on 18-21 Jul 77, p169-174.

No abstract available.

AD-A074 045/6 PC **A03**/MF **A01**
Advisory Group for Aerospace Research and Development Neuilly-sur-Seine (France)
Corrosion Information in NATO Nations.
Advisory rept.,
Nathan E. Promisel. Jul 79, 38p Rept no. AGARD-AR-141

Basically, the purpose of this study is (1) to determine the needs of the NATO aerospace industry and related Government establishments for technical data relevant to corrosion principles, material behavior in hostile environments, corrosion prevention, etc.; (2) to determine what national and international resources exist that could be responsive to these needs and what were the facilities for collecting, analyzing, coding, storing and retrieving the desired information; and (3) to suggest approaches to filling identified gaps and unsatisfied needs. The study was limited to generic types of information needed and the mechanics of transferring this information. Excluded were the study of specific and detailed technical corrosion problems and remedies and, for example, the identification and description of extant research projects, except in special cases.

AD-A074 060/5 Not available NTIS
Wisconsin Univ-Madison Dept of Metallurgical and Mineral Engineering
Discussion of 'Nucleation, Undercooling and Homogeneous Structures in Rapidly Solidified Powders',
J. H. Perepezko, and D. H. Rasmussen. 5 Jun 78, 3p ARO-14190.2-MS
Grant DAAG29-76-G-0316, Contract DAAG29-78-G-0157
Sponsored in part by Grant NSF-DMR77-13932.
Availability: Pub. in Metallurgical Transactions A, v9A p1490-1492 Oct 78. (No copies furnished by DDC).

No abstract available.

AD-A074 061/3 Not available NTIS
Rice Univ Houston TX Dept of Mechanical and Aerospace Engineering and Materials Science
Volume Effects in Iron-Carbon Solid Solutions,
Rex B. McLellan. 12 Dec 77, 3p ARO-13038.3-MS
Grant DAAG29-76-G-0083
Availability: Pub. in Scripta Metallurgica, v12 n4 p345-347 1978. (No copies furnished by DDC).

No abstract available.

AD-A074 093/6 PC **A03**/MF **A01**
Carnegie-Mellon Univ Pittsburgh PA Dept of Metallurgy and Materials Science
Phase Transformations and Tensile Properties of Ti-10V-2Fe-3Al.
Technical rept.,
T. W. Duerig, G. T. Terlinde, and J. C. Williams. Aug 79, 39p Rept no. JWTR-5
Contract N00014-76-C-0409

The effect of heat treatment on the microstructure of the metastable beta alloy Ti-10V-2Fe-3Al has been studied using light and electron metallography, analytical electron microscopy, and X-ray diffraction. A limited survey of the effect of microstructure on tensile properties of the alloy also has been conducted. It has been found that the alloy contains inclusions which are rich in Ti, S, Si, and P. The alloy has been shown to form the omega phase both athermally and isothermally. The isothermal omega can have either an ellipsoidal or a cuboidal morphology. The reasons for this are enumerated. The formation of the equilibrium alpha phase has been studied, and three distinct modes of formation are described. A stress induced othorhombic martensite also has been observed. The effect of this stress induced product on tensile behavior is discussed. The relative roles of inclusions and alpha phase precipitates on tensile fracture also have been examined. (Author)

AD-A074 104/1 PC **A08**/MF **A01**
Westinghouse Research and Development Center Pittsburgh PA
Environmental Hydrogen Cracking of HY Steel Weld Metals.
Final rept. 1 May 77-30 Jun 79,
E. W. Johnson, and B. J. Shaw. 15 Aug 79, 174p Rept no. 79-9D9-HONRY-R1
Contract N00014-77-C-0372

Techniques used in a program to develop HY steel weld metals with improved resistance to environmental hydrogen cracking include (1) levitation melting and chill casting of Charpy-size specimens, and (2) accelerated environmental testing by the H2S rising-load method. The measured values of K(or), the stress intensity of crack-growth onset, had satisfactory reproducibility as well as sensitive response to composition. However, K(or)

is larger than the threshold stress intensity K(arr) (or K(Iscc)) by an amount that varies directly with t(io), the incubation-time constant. Since t(io) is short relative to design life, only k(arr) has design significance. Two new accelerated methods of determining K(arr) are (1) a modified rising-load test in which the displacement is held constant after crack-growth onset, and (2) a similar procedure substituting environmental fatigue precracking for the rising-load phase. (Author)

AD-A074 113/2 PC **A04/MF A01**
Rockwell International Thousand Oaks CA Science Center
Treatment of AM 355 Steel for Adhesive Bonding.
Final rept. 12 Jun 78-31 May 79,
Ron Haak, and Tennyson Smith. Jul 79, 66p
Rept no. SC5169.16FR
Contract DAAK10-78-C-0227

Surface treatments for AM355 prior to adhesive bonding have been developed. A sulfuric acid-dichromate immersion treatment and nitric acid anodization treatment have produced extremely strong durable bonds. Wedge test values (at 50 degrees C using 0.040 in. (0.102 cm) stock) are about 0.05-0.06 in./24 hr (0.13-0.15 cm/24 hr). Using a method now in use (HP4-121) results of greater than 1 in/day (2.5 cm) are obtained. Stress durability (ASTM D2919, 60 degrees C, 100% RH, 2000 psi (13.8 mPa)) tests show an average time to failure of about 500 hrs compared to the less than 1 hour time to failure obtained using the present method. It was found that increased bond durability, measured by the wedge test, was directly related to the increased chromium content of the surface oxide layer produced using these and other treatments. Experiments indicate that AM355 is essentially impermeable to hydrogen, i.e., the diffusion coefficient was unmeasurable using an electrochemical technique sensitivite to 0.1 ppm of mobile hydrogen. Although both methods mentioned above are commercially applicable, the HNO3 anodize appears the best because of the absence of carcinogenic dichromates, the lower production cost and slightly better bond results. (Author)

AD-A074 134/8 PC **A03/MF A01**
Naval Research Lab Washington DC
Abyssal Corrosion and Its Mitigation. Part I. Details of Pilot Test Exposure.
Memorandum rept.,
L. J. Waldron, M. H. Peterson, B. W. Forgeson, and B. F. Brown. Mar 62, 27p Rept no. NRL-MR-1282
See also Part 2, AD-296 545.

In March of 1962, an array on which are mounted 144 metallic and non-metallic samples will be exposed in the Tongue of the Ocean area (TOTO) in the Bahama Islands at a depth of approximately 5500 feet. The main objectives of these studies are two-fold; first, to obtain long term corrosion data on a number of basic engineering materials at great depths, so that this data may be correlated with the voluminous corrosion data available for similar materials when exposed at or near the surface of the ocean, and second, to evaluate the various components of the complete test system. Additionally, methods of corrosion mitigation are included to determine their relative effectiveness at these depths. (Author)

AD-A074 136/3 PC **A02/MF A01**
Naval Research Lab Washington DC
Effects of Electrochemical Potential on Stress Corrosion Cracking of Aluminum Alloy 7079-T6 in Salt Water.
Memorandum rept.,
M. H. Peterson, J. A. Smith, and B. F. Brown. Nov 62, 15p Rept no. NRL-MR-1370
Errata sheet inserted.

Cathodic protection schemes can greatly extend the useful life of the high strength aluminum alloy 7079, but because of general cathodic wastage at high cathodic currents, cathodic protection cannot produce indefinite immunity to stress corrosion cracking. For long-term applications in sea water requiring this alloy a high-integrity paint system backed up with a galvanic anode system would be indicated for maximum reliability. (Author)

AD-A074 166/0 PC **A04/MF A01**
Connecticut Univ Storrs Inst of Materials Science
Surface Hardening by Laser Skin Melting.
Progress rept. no. 1,
Peter R. Strutt. Jul 79, 66p
Contract N00014-78-C-0580

A basic study has been initiated on the microstructural characterization of rapid quenched iron-base alloys produced by electron beam-glazing and laser-glazing. The quantitative effect of processing parameters (i.e., beam velocity, power, etc.) on melt zone geometry have been determined using M2 tool steel as a reference material. The conditions range from superficial surface melting with correspondingly high cooling rates (similar to 1/1000000 degrees centigrade s) to the deep penetration mode, with a cooling rate of similar to 1/1000 degrees centrigrade s. The comparison of electron beam and laser-glazing was particularly striking, since the power efficiency in surface melting was ten times greater using an electron beam. Furthermore, electron beam-glazing produced (1) a uniform and smooth surface, (2) a constant depth of melting, and (3) a homogeneous microstructure. These highly desireable features were not achieved to the same degree in the laser-glazing experiments.

AD-A074 185/0 PC **A04/MF A01**
Naval Postgraduate School Monterey CA
High Strength Aluminum-Magnesium Alloys: Thermomechanical Processing, Microstructure and Tensile Mechanical Properties.
Master's thesis,
Raymond Arthur Grandon. Mar 79, 73p

Microstructures and mechanical properties of thermomechanically processed Aluminum-Magnesium alloys were investigated in this research. Magnesium content of the alloys ranged from 7 to 12 weight percent and an alloy containing 10 percent Mg and 0.5 percent Cu was also examined. Thermomechanical processing treatments involved solution treatment followed by warm isothermal rolling. Temperature for this warm rolling was typically 300 C, and this is below the solvus temperature for the alloy. Such processing results in a fine dispersion of the intermetallic compound Al3Mg2 (beta) in a solid solution matrix. Typical mechanical properties are an ultimate tensile strength of 520 Mpa (75000 psi), with 12 percent elongation to fracture. Such a material may be further cold worked to ultimate tensile strengths of 620 Mpa (90000 psi), with 6 percent elongation to fracture. Dynamic recrystallization is necessary to achieve a uniform dispersion of the intermetallic in subsequent processing. (Author)

AD-A074 333/6 Not available NTIS
Florida Univ Gainesville Dept of Materials Science and Engineering
Evidence for Slow Strain-Rate Embrittlement in Tantalum due to Oxygen,
A. E. Diaz, and R. E. Reed-Hill. 16 Apr 79, 6p
ARO-14096.1-MS
Grant DAAG29-77-G-0080
Availability: Pub. in Scripta Metallurgica, v13 n6 p491-496 1979. (No copies furnished by DDC).

No abstract available.

AD-A074 348/4 Not available NTIS
Illinois Univ at Urbana-Champaign
The Effect of Austenite Ordering on the Transformation Temperature, Transformation Hysteresis, and Thermoelastic Behavior in Fe-Pt Alloys,
M. Umemoto, and C. M. Wayman. 14 Nov 77, 7p
ARO-14868.2-MS
Contract DAAG29-78-G-0041
Availability: Pub. in Metallurgical Transactions A, v9A p891-897 Jul 78. (No copies furnished by DDC).

No abstract available.

CONF-790236 PC **A10/MF A01**
Department of Energy, Washington, DC. Div. of Materials Sciences.
Time-Dependent Fracture of Materials at Elevated Temperature.
S. M. Wolf. Jun 79, 204p
Workshop on time-dependent fracture of materials, Germantown, MD, USA, 15 Feb 1979.
Separate abstracts have been prepared for items within the scope of the energy data base. (ERA citation 04:050304)

HEDL-TME-79-7 PC **A06/MF A01**
Hanford Engineering Development Lab., Richland, WA.
Interactions of Liquid Lithium with Various Atmospheres, Concretes, and Insulating Materials; and Filtration of Lithium Aerosols.
D. W. Jeppson. Jun 79, 125p
Contract EY-76-C-14-2170

This report describes the facilities and experiments and presents test results of a program being conducted at the hanford Engineering Development Laboratory (HEDL) in support of the fusion reactor development effort. This experimental program is designed to characterize the interaction of liquid lithium with various atmospheres, concretes, and insulating materials. Lithium-atmosphere reaction tests were conducted in normal humidity air, pure nitrogen, and carbon dioxide. These tests are described and their results, such as maximum temperatures, aerosol generated, and reaction rates measured, are reported. Initial lithium temperatures for these tests ranged between 224 exp 0 C and 843 exp 0 C. A lithium-concrete reaction test, using 10 kg of lithium at 327 exp 0 C, and lithium-insulating materials reaction tests, using a few grams of lithium at 350 exp 0 C and 600 exp 0 C, are also described and results are presented. In addition, a lithium-aerosol filter loading test was conducted to determine the mass loading capacity of a commercial high efficiency particulate air (HEPA) filter. The aerosol was characterized, and the loading-capacity-versus-pressure-buildup across the filter is reported. (ERA citation 04:050912)

LBL-9308 PC **A06/MF A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Effect of Coal Char on the Corrosion of 304 SS.
T. F. W. Foerster. Jun 79, 106p
Contract W-7405-ENG-48
Thesis.

A layer of coal char covering a metal surface affects the sulfur and oxygen partial pressures at the metal surface and the rate and extent of corrosion. Experiments demonstrating the effect of char composition, depth, bulk gas composition and flow rate on the rate of sulfidation are carried out. A simple theoretical model, predicts the concentration profiles and fluxes of the gaseous species in the char. Since coal char contains carbon, the equilibrium oxygen partial pressure is less than 10 exp -18 atm. This low oxygen partial pressure prevents the formation of protective oxide scales and, in some cases, leads to the formation of external sulfide scales. The effect of the layer of char on the sulfur partial pressure at the metal surface depends on the composition of the char. If the char contains a large amount of sulfur-rich volatiles, the sulfur partial pressure of the gas in the char and the extent of sulfidation depend on the composition of the volatiles. If the char contains significant amounts of inorganic ash, the sulfur partial pressure of gas in contact with the char is determined by the equilibria of the various reactions between hydrogen sulfide and ash. For both types of char, the pattern and extent of corrosion of samples exposed for short times are essentially independent of the composition of the bulk gas and the thickness of the char layer. If the char does not contain large amounts of ash or all of the ash has reacted, the sulfur partial pressure at the metal surface is determined by the diffusion of hydrogen sulfide through the char layer. In this case the rate of sulfidation is inversely proportional to the thickness of the char layer and proportional to the hydrogen sulfide in the gas. (ERA citation 04:050340)

N79-31371/4 PC **A03/MF A01**
National Aeronautical Establishment, Ottawa (Ontario).
Forging Behaviour of Superalloy Compacts and Composites.
A. Kandeil, J. P. Immarigeon, and W. Wallace.
Feb 78, 46p NRC-18543, LR-595

The forging behavior of hot isostatically pressed nickel-base super-alloy (Mar M200) compacts, reinforced with 40% volume fraction of tungsten wires, was examined and compared with that of

the non-reinforced alloy matrix. Subscale forging blanks, 10 x 10 x 15 mm high for the composite and 9.65 mm high by 6.35 mm in diameter for the matrix, were deformed by means of isothermal compression. Under identical working conditions, peak flow stresses for the composite specimens are up to four times those for the non-reinforced matrix. Furthermore, the strain rate sensitivity of the composite is approximately half that of the superplastic matrix. A rationalization of these differences is presented. Forming limit criteria for the composite are examined. A model is considered which predicts an upper bound forming limit beyond which severe damage is introduced into the composite. In the present case, the maximum strain achievable is predicted and shown to be aproximately 0.34. At lower strains, formability is shown to be further limited by void nucleation at the tensile poles of the wires, normal to the loading direction.

N79-31373/0 PC **A03**/MF **A01**
Canada Inst. for Scientific and Technical Information, Ottawa (Ontario).
Hydrogen in Iron and Steel.
E. Riecke. 1979, 33p ISSN-0077-5606, NRC/CNR-TT-1948
Tran-Transl. Into English from Arch. Eisenhuttenwes (Germany, F.R.), V. 49, No. 11, 1978 p 509-520.

For the explanation of the fracture mechanisms, the pressure theory and the adsorption decohesion theory was suggested. Each of these theories is justified and capable to describe a partial aspect of the fracture phenomena. None of the theories pretends to be perfect and generally valid. Since hydrogen is effective in a various and complex manner, all phenomena cannot be described by one theory.

N79-31619/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Strainrange Partitioning Life Predictions of the Long Time Metal Properties Council Creep-Fatigue Tests.
J. F. Saltsman, and G. R. Halford. 1979, 34p NASA-TM-79260, E-174
Conf-Proposed for Presentation at the Winter Ann. Meeting, N. Y., 2-7 Dec. 1979; Sponsored by AM. Soc. Of Mech. Engr.

The method of strainrange partitioning is used to predict the cyclic lives of the Metal Properties Council's long time creep-fatigue interspersion tests of several steel alloys. Comparisons are made with predictions based upon the time- and cycle-fraction approach. The method of strainrange partitioning is shown to give consistently more accurate predictions of cyclic life than is given by the time- and cycle-fraction approach.

STU-72-1154/U923 PC **A03**/MF **A01**
Styrelsen foer Teknisk Utveckling, Stockholm (Sweden).
Influence of Microstructure, in Particular Grain Size, on the Low Cyle Fatigue Behavior at Service Temperature of the Superalloys X40, UDIMET 500, in 738 LC and INCONEL 739.
R. Ekbom, J. Viklund, and H. Johansson. 21 Nov 77, 44p
U.S. Sales Only.

The microstructure of cast turbine blades can show a wide variation between different castings. The following tests were made to investigate the effect of microstructure on fatigue LCF tests on UDIMET 500, INCONEL 738 LC, X 40 and INCONEL 939 were performed on material with large and with small grain sizes. Crack propagation tests were performed on UDIMET 500, X 40 and INCONEL 738 LC. Different grain sizes were tested. In the LCF tests the large grain size gives superior properties in material INCONEL 739 and X 40 while LCF properties in material UDIMET 500 and INCONEL 738 LC appear to be insensitive to grain size. In the crack propagation tests there is no significant difference in propagation rate between the different grain sizes. Difference in the LCF properties may not be grain sizes but other structural variables. For X 40 the morphology of the carbide phase might be the most important factor. In INCONEL 739 there is a greater probability for interdendritic fracture in the small grain size material and this may be the reason for the difference in the LCF properties. (ERA citation 04:050298)

11H. Oils, Lubricants, and Hydraulic Fluids

AD-A074 073/8 PC **A03**/MF **A01**
Southwest Research Inst San Antonio TX Army Fuels and Lubricants Research Lab
The Physical and Chemical Characterization of Ten Military Turbine Engine Lubricants.
Final rept. Jul 79-Sep 79,
Frank M. Newman, and Leo L. Stavinoha. Sep 79, 32p Rept no. AFLRL-115
Contract DAAK70-79-C-0142
Original contains color plates: All DDC and NTIS reproductions will be in black and white.

Four MIL-L-23699B and six MIL-L-7808G turbine engine lubricants have been characterized from the physical properties and chemical composition of their basestocks. The four MIL-L-23699 lubricants were found to be 100% polyol esters. Of the six MIL-L-7808 lubricants, four were mixtures of polyol esters and diesters, one was 100% polyol ester, and one was 100% diester. Correlation of the chemical data is made to some of the physical properties wherever possible. (Author)

AD-A074 281/7 Not available NTIS
Rice Univ Houston TX Dept of Chemistry
Poly(carbon monofluoride): A Solid, Layered Fluorocarbon,
Peter Kamarchik, Jr., and John L. Margrave. 12 Jul 76, 5p ARO-15258.7-C
Grant DAAG29-77-G-0169
Availability: Pub. in Accounts of Chemical Research, v11 p296-300 1978 (No copies furnished by DDC).

No abstract available.

N79-31346/6 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Surface Chemistry of Iron Sliding in Air and Nitrogen Lubricated with Hexadecane and Hexadecane Containing Dibenzyl-Dilsulfide.
D. R. Wheeler. Sep 79, 15p NASA-TP-1545, E-9956

Wear experiments were conducted on iron sliding in hexadecane and hexadecane plus one weight percent dibenzyl dilsulfide (DBDS) in atmospheres of air and nitrogen at room temperature. The wear scars and the wear debris were analyzed by X-ray photoelectron spectroscopy. The presence of air reduced wear but increased friction, while DBDS reduced friction but had little effect on wear except that the wear increased somewhat when DBDS was used in air. Wear scar analysis indicated that oxygen and sulfur competed chemically for the surface, with the oxide predominating. Low wear was associated with a thick oxide layer and low friction with a thin predominantly sulfide layer. Analysis of the wear debris indicated the presence of a sulfate in the high wear case (hexadecane plus DBDS in air), and showed the presence of an organic sulfide in the low wear case (Hexadecane plus DBDS in nitrogen).

PATENT-4 166 071 Not available NTIS
Department of the Air Force Washington DC
Monophospha-S-Triazines.
Patent,
Kazimiera L. Paciorek, Reinhold H. Kratzer, Jacquelyn Kaufman, and Thomas I. Ito. Filed 28 Dec 77, patented 28 Aug 79, 3p AD-D006 319/8, PAT-APPL-865 271
Supersedes PAT-APPL-865 271-77, AD-D004 695.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method is given for synthesizing monophosphas-triazines by effecting a reaction between an amidoylamidine and a trihalo-phosphorane. (Author)

11I. Plastics

AD-A073 878/1 PC **A03**/MF **A01**
Illinois Univ at Urbana-Champaign Dept of Chemistry
Preparation and Catalytic Oxidizing Potential of Polymer Supported Chelating Amine and Schiff Base Complexes.
Interim technical rept.,
Russell S. Drago, John Gaul, Alan Zombeck, and Darel K. Straub. 10 Jul 79, 36p Rept no. TR-3-ONR
Contract N00014-78-C-0245

Synthetic procedures for attaching multidentate amines to organic polymers are described. These materials form the basis for the preparation of a wide variety of macrocyclic and chelating ligands that can be covalently attached to polymers. The reaction to produce Schiff base chelates is described, and a series of covalently attached metal complexes were prepared and identified. These systems have potential as catalysts for organic oxidations. (Author)

AD-A073 930/0 PC **A08**/MF **A01**
McDonnell Douglas Research Labs St Louis MO
The Relation Between the Chemical and Physical Structure and the Mechanical Response of Polymers.
Final scientific rept. 1 Apr 76-30 Jun 78,
Roger J. Morgan, and James E. O'Neal. 30 Jun 79, 155p Rept no. MDC-Q0653
Contract F44620-76-C-0075

No abstract available.

AD-A074 041/5 Not available NTIS
Rice Univ Houston TX Dept of Chemistry
Synthesis of 'Superstoichiometric' Poly(Carbon Monofluoride),
R. J. Lagow, R. B. Badachhape, J. L. Wood, and J. L. Margrave. 17 Nov 73, 2p ARO-15258.3-C
Grant DAAG29-77-G-0169
Availability: Pub. in Jnl. of the American Chemical Society, v96 n8 p2628-2629, 17 Apr 74 (No copies furnished by DDC).

No abstract available.

AD-A074 303/9 Not available NTIS
Rochester Univ NY Dept of Mechanical and Aerospace Sciences
The Angles of Intersection of Coarse Shear Bands in Polystyrene.
21 Aug 79, 5p ARO-13566.2-MS
Grant DAAG29-76-G-0314
Availability: Pub. in Jnl. of Materials Science, v14 p1500-1502 1979. (No copies furnished by DDC).

No abstract available.

N79-31391/2 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Mechanical and Chemical Effects of Ion-Texturing Biomedical Polymers.
A. J. Weigand, and M. A. Cenkus. 1979, 29p NASA-TM-79245, E-152
Conf-Presented at 32nd Ann. Conf. Of Engr. In Med. And Biol., Denver, 6-10 Oct. 1979; Sponsored by Alliance for Engr. In Med.

To determine whether sputter etching may provide substantial polymer surface texturing with insignificant changes in chemical and mechanical properties, an 8 cm beam diameter, electron bombardment, argon ion source was used to sputter etch (ion-texture process) nine biomedical polymers. The materials included silicone rubber, 32% carbon impregnated polyolefin, polyoxymethylene, polytetrafluoroethylene, ultrahigh molecular weight (UHMW) polyethylene, UHMW polyethylene with carbon fibers (10%), and several polyurethanes (bioelectric, segmented, and cross linked). Ion textured microtensile specimens of each material except UHMW polyethylene and UHMW polyethylene with 10% carbon fibers were used to determine the effect of ion texturing on tensile properties. Scanning electron microscopy was used to determine surface morphology changes, and electron spectroscopy for chemical analysis was used to analyze the near surface chemical changes that result from ion texturing. Ion energies of 500 eV with beam current densities ranging from 0.08 to 0.19 mA/sq cm were used to ion texture the various materials. Standard microtensile specimens of seven polymers were exposed to a saline environment for 24 hours prior to and during the tensile testing. The surface chemical changes resulting

from sputter etching are minimal in spite of the often significant changes in the surface morphology.

PAT-APPL-6-047 528 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Polyaromatic Ether-Keto-Sulfones and Their Synthesis.
Patent Application,
Carl S. Marvel. Filed 8 Jun 79, 20p AD-D006 303/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

In recent years polymeric materials have become available that possess heat resistance and strength properties previously found only in metals. Additionally, the polymers are much lighter than metals, an important advantage where weight is a factor as in modern, high speed aerospace applications. While it is possible to tailor a polymer system for a given application, the processing problem has been a restrictive factor in limiting the use of high temperature resistant polymers. In processing a polymer into a composite structure, the polymer must flow in order to impregnate the reinforcing substrate and mold it to the desired form. The lower the softening point (Tg) or the melting point (Tm) of a polymer the easier it is to cause the polymer to flow. While it is desirable that a polymer have a low softening point, a composite fabricated from such a polymer loses its strength at temperatures approaching its softening point. In order that such a composite may be suitable for use at temperatures higher than the polymer's softening point, a procedure is required for subsequently raising the softening point of the polymer higher than the desired maximum use temperature.

PB80-100746 Not available NTIS
National Bureau of Standards, Washington, DC.
Creep Failure and Fracture of Polyethylene in Uniaxial Extension.
Final rept.,
J. M. Crissman, and L. J. Zapas. Feb 79, 5p
Pub. in Polymer Engineering and Science 19, n2, p99-103, Feb 79.

It is shown that under conditions of uniaxial creep the fracture of high density polyethylene can be categorized as one of three types, depending upon the magnitude of the applied load, molecular architecture, and environment. When subjected to relatively large loads, the specimens neck and then fracture almost immediately. At the other extreme of very small initial loadings, the specimens fracture in a brittle fashion through crack formation and growth. In the intermediate range of loadings the specimens neck and, depending upon the molecular weight and molecular weight distribution, may then elongate substantially before fracture. It is shown that the uniaxial creep behavior for the region where drawing occurs, when plotted in terms of isochrones, represents a type of phase diagram, one boundary of which describes the fracture envelope. In addition, experiments employing different constant rate of loading histories are described and an additivity of damage criterion used to predict the time to failure under constant load conditions, and vice versa.

11L. Wood and Paper Products

COO-2893-9 PC **A09**/MF **A01**
Illinois Univ. at Urbana-Champaign. Office of Vice Chancellor for Research.
Energy Optimal Use of Waste Paper. Final Report.
T. L. Gunn. Nov 78, 186p
Contract EY-76-S-02-2893

In 1974, Americans consumed 65.5 million tons of paper. Of this, 12.1 million tons were recycled and 53.4 million tons were lost in use or became municipal solid waste. The paper which became solid waste could have been burned as a fuel or used as a raw material to make more paper. The report discusses what mix of burning and recycling of waste paper would minimize the total US energy used to make and dispose of the 1974 production of paper. Five cases are analyzed to determine the effects of various assumptions about how the energy in wood and paper will be treated. In one case, both wood and paper are assumed to have an energy value. In another, neither wood nor paper is assumed to have an energy value. In the other three cases, paper, but not wood, is assumed to have an energy value which is utilized differently in each case. It is found in each case that it is worthwhile in terms of energy conservation to recycle as much high-grade de-inking waste paper as can be collected. How much of the other grades of waste paper would be recycled depends on which of the various energy-accounting schemes is used. It is further found that the greatest energy savings are accomplished when both wood and waste paper are acknowledged to have an energy value. The greatest energy savings attainable in any case would be 30% of the energy actually used by the system in 1974. (ERA citation 04:048754)

PB80-103922 PC **A14**/MF **A01**
Missouri Univ.-Columbia. Dept. of Civil Engineering.
The Evaluation of Cellulose Sources for Unconventional Nutritional Uses.
Final rept.,
Charles E. Dunlap. Feb 79, 305p NSF/RA-790166
Grant NSF-AER76-17912

Development of a standard assay technique and its application in measuring the nutritional quality of various cellulosic materials are described. About 30 different sources of cellulose were collected for testing and evaluation. Cellulose availability and composition were studied. The major criteria used to identify promising cellulose sources were availability, cost, and quality. On this basis nine materials were selected for potential use in non-conventional nutritional applications. The search for and design of a standard test or assay technique for measuring the nutritional quality of cellulosics resulted in the selection of a controlled digestion using cellulase enzymes as hydrolytic degrading agents. Hydrolysis was monitored by weight loss of substrate or production of reducing sugars. This assay technique was applied to the nine selected cellulosics in an untreated state. Differences among the materials were clearly distinguishable. Data thus obtained was used to design a mathematical model for predicting operating characteristics for a continuous flow hydrolysis system. Use of the model provides a standard basis for comparing the nutritional value of various cellulose sources.

12. MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

AD-A073 850/0 PC **A02**/MF **A01**
Stanford Univ CA Dept of Statistics
Variance Reduction in Monte Carlo Simulation.
Technical rept.,
Mark Brown, Herbert Solomon, and Michael A. Stephens. 26 Jun 79, 17p TR-274, TR-35, ARO-144.35.35-M
Contract N00014-76-C-0475, Grant DAAG-29-77-G-0031

The problem of Monte Carlo estimation of M(t) = EN(t), the expected number of renewals (O,t) for a renewal process with known interarrival time distribution F, is considered. Several unbiased estimators which compete favorably with the naive estimator, N(t), are presented and studied. We believe that our approach and methodology, although only applied to renewal function estimation in this paper, can be useful in a large variety of problems. (Author)

AD-A073 861/7 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
Modified Modal Theory of Transient Response in Layered Media,
L. Tsang, and J. A. Kong. 28 Apr 78, 15p
Contract DAAG29-78-C-0020, Grant NSF-ENG76-01654
Pub. in Jnl. of Mathematical Physics, v20 n6 p1170-1182 Jun 79.

No abstract available.

AD-A073 908/6 Not available NTIS
Northwestern Univ Evanston IL Dept of Engineering Science and Applied Mathematics
The Exit Problem for Randomly Perturbed Dynamical Systems,
Bernard J. Matkowsky, and Zeev Schuss. 14 Apr 76, 19p ARO-15486.7-M
Grants DAAG29-77-G-0222, NSF-MPS75-08328
Availability: Pub. in SIAM Jnl. of Applied Mathematics, v33 n2 p365-382 Sep 77.

No abstract available.

AD-A073 933/4 Not available NTIS
Stanford Univ CA
A Dynamical Interpretation of Column and Row Properness of Matrix Fraction Descriptions,
Brian D. O. Anderson, and Robert R. Bitmead. 28 May 78, 2p ARO-15168.6-M
Contract DAAG29-77-C-0042
Prepared in cooperation with Newcastle Univ. (Australia), Dept. of Electrical Engineering.
Availability: IEEE Transactions on Automatic Control, vAC-23 n6 p1101-1102 Dec 78. (No copies furnished by DDC).

No abstract available.

AD-A073 941/7 Not available NTIS
California Univ Berkeley Statistical Lab
Developments in Probability and Mathematical Statistics Generated by Studies in Meteorology and Weather Modification,
Jerzy Neyman. Apr 79, 12p ARO-13676.7-M
Contract N00014-75-C-0159, Grant DAAG29-76-G-0167
Availability: Pub. in Communications Statistics, Part A. Theory Methods, vA8(11) p1097-1110 1979. (No copies furnished by DDC).

No abstract available.

AD-A073 953/2 Not available NTIS
Illinois Univ at Urbana-Champaign Coordinated Science Lab
State Estimation Under Uncertain Observations with Unknown Statistics,
A. H. Haddad, and J. K. Tugnait. 12 Jan 79, 7p Rept no. TP5-3:45
Contract DAAG29-76-G-0154
Availability: Pub. in Proceedings of the 1978 IEEE Conference on Decision and Control including the Symposium on Adaptive Processes (17th). IEEE Control Systems Society, held at Islandia Hyatt House Hotel, San Diego, CA, 10-12 Jan 79. (No copies furnished by DDC).

No abstract available.

AD-A073 974/8 PC **A03**/MF **A01**
Harry Diamond Labs Adelphi MD
QINTEG--A Program for Computing Gaussian Quadrature Coefficients.
Technical rept.,
Theodore H. Hopp. Aug 79, 35p Rept no. HDL-TR-1890

This report presents a program (QINTEG) to compute Gaussian quadrature coefficients for integration with respect to a weighting function. Discontinuities, singularities, or oscillatory behavior of integrands make many problems unsuited to numerical solution using existing general purpose integration programs. When the undesirable behavior of the integrand can be absorbed into the weighting function, numerical integration using the coefficients computed by QINTEG can be accomplished. Improvement of nearly two orders of magnitude in execution time over an existing program was achieved for a problem involving oscillatory integrands. A program listing is included. (Author)

AD-A073 985/4 Not available NTIS
Missouri Univ-Rolla Dept of Mathematics
Construction of Optimal Unbiased Inference Procedures for the Parameters of the Gamma Distribution,
Max Engelhardt, and Lee J. Bain. Aug 77, 5p ARO-13809.4-M
Grant DAAG29-77-G-0128
Availability: Pub. in Technometrics, v20 n4 p485-489 Nov 78. (No copies furnished by DDC).

No abstract available.

AD-A073 989/6 Not available NTIS
Missouri Univ-Rolla Dept of Mathematics
Prediction Limits and Two-Sample Problems with Complete or Censored Weibull Data,
Max Engelhardt, and Lee J. Bain. Nov 77, 5p ARO-13809.10-M
Grants DAAG29-77-G-0128, DAAG29-78-G-0094
Availability: Pub. in Technometrics, v21 n2 p233-237 May 79. (No copies furnished by DDC).

No abstract available.

AD-A074 017/5 PC **A02**/MF **A01**
Rutgers - the State Univ New Brunswick NJ
Qualitative Study of Nonlinear Problems in Analysis.
Final technical rept. no. 1, 1 Jan 66-30 Jun 79,
Jane Cronin Scanlon. 30 Aug 79, 12p ARO-6131.25-M, ARO-12981.2-M
Contract DAHC04-75-C-0148, Grant DA-ARO-D-31-124-G-784
Sponsored in part by Grants DA-ARO-D-31-124-G1098 and DA-ARO-D-31-124-72-G69.

The objective of the work was to use qualitative methods, especially fixed point theorems and topological degree, to study nonlinear problems in analysis. Existence of solutions of wide classes of abstract nonlinear functional equations are established and the existence of recurrent and period solutions of nonlinear ordinary differential equations are obtained. Upper bounds for the number of such solutions are also obtained. Such upper bounds for the number of periodic solutions of nonlinear ordinary differential equations have become significant in mathematical studies of chemical reactions. Several results in the stability of periodic solutions of nonlinear ordinary differential equations were also estabiished. Several mathematical problems which arise in physiology were studied. The most specific conclusion obtained is a clinical recommendation for the treatment of patients suffering from a rupture of an aneurysm of the circle of Willis. Finally, two books have been written: a textbook on qualitative theory of ordinary differential equations and a set of lecture notes on the mathematics of cell electrophysiology. (Author)

AD-A074 052/2 PC **A07**/MF **A01**
Brown Univ Providence RI Lefschetz Center for Dynamical Systems
Applications of Centre Manifold Theory.
Technical rept.,
Jack Carr. Jun 79, 137p ARO-13915.17-M
Grant DAAG29-76-G-0294

The purpose of the lectures was to give an introduction to the applications of centre manifold theory to differential equations. Most of the material is presented in an informal fashion, by means of worked examples in the hope that this clarifies the use of centre manifold theory. (Author)

AD-A074 063/9 Not available NTIS
State Univ of New York at Stony Brook
On Dual Integral Equations with Trigonometric Kernels,
R. P. Srivastav. 11 Feb 77, 4p ARO-13567.1-M
Grant DAAG29-76-G-0197
Availability: Pub. in Quarterly of Applied Mathematics, v35 n4 p524-526 Jan 78. (No copies furnished by DDC).

No abstract available.

AD-A074 079/5 PC **A03**/MF **A01**
Stanford Univ CA Dept of Computer Science
Fast Algorithms for Solving Path Problems.
Technical rept.,
Robert Endre Tarjan. Apr 79, 50p Rept no. STAN-CS-79-734
Contract N00014-76-C-0688, Grant NSF-MCS75-22870

Let G = (V,E) be a directed graph with a distinguished source vertex s. The single-source path expression problem is to find, for each vertex v, a regular expression P(s,v) which represents the set of all paths in G from s to v. A solution to this problem can be used to solve shortest path problems, solve sparse systems of linear equations, and carry out global flow analysis. We describe a method to compute path expressions by dividing G into components, computing path expressions on the components by Gaussian elimination, and combining the solutions. This method requires 0 (m alpha o(m,n)) time on a reducible flow graph, where n is the vertices in G, m is the number of edges in G, and alpha is a functional inverse of Ackermann's function. The method makes use of an algorithm for evaluating functions defined on paths in trees. A simplified version of the algorithm, which runs in 0(m log n) time on reducible flow graphs, is quite easy to implement and efficient in practice. (Author)

AD-A074 090/2 PC **A02**/MF **A01**
Massachusetts Univ Amherst Dept of Mathematics and Statistics
On the Uniformly Minimum Variance Unbiased Estimators of the Variance and its Reciprocal of an Inverse Gaussian Distribution.
Interim rept.,
Ramesh M. Korwar. Jul 79, 10p TR-3, AFOSR-TR-79-0979
Contract F49620-79-C-0105

The two-parameter Inverse Gaussian distribution is found to have useful applications in a wide variety of fields. The uniformly minimum variance estimator of its mean is known and is the simple mean. However, no such estimator of the variance is reported in literature. Here the uniformly minimum variance unbiased estimators of the variance and its reciprocal are derived. (Author)

AD-A074 091/0 PC **A02**/MF **A01**
Michigan Univ Ann Arbor Dept of Electrical and Computer Engineering
Vectorized Sparse Examination.
Interim rept.,
D. A. Calahan. Aug 79, 13p AFOSR-TR-79-0980
Grant AFOSR-75-2812
Presented at the Scientific Computer Information Exchange Meeting, 12-13 Sep 79, Livermore, CA.

Vectorizable sparse equation solution algorithms are classified by the matrix structure which they favor. The state-of-the-art for solution of relatively dense systems is then reviewed. A hybrid vector construct is defined for the increasingly common structure of both moderate local matrix density and global matrix regularity. Estimates are made of CRAY-1 speedup achievable with this construct. A finite difference matrix is studied as an example. (Author)

AD-A074 099/3 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington DC
Are Non-Parametric Tests Distribution-Free,
Ardie Lubin. 1961, 15p

An increasing use is being made of non-parametric tests, i.e., tests of significance which are not based on the usual assumption that all distributions are normal. Many psychologists have assumed that when non-normality or heterogenous variance is encountered in the data, then analysis of variance by ranks, the Mann-Whitney U Test (1947), Festinger's d (1946), or some similar non-parametric technique is appropriate. The purpose of this paper is to point out that non-parametric tests also have basic assumptions which must be met, and that often the factors which bar the use of the parametric tests also violate the assumptions underlying most of the non-parametric tests.

AD-A074 100/9 PC **A02**/MF **A01**
Walter Reed Army Inst of Research Washington DC
The Effect of Correlation on the Repeated-Measurements Design,
Ardie Lubin. Mar 61, 15p

The purpose of this paper is to point out that: (a) any repeated measurements on the same organism will in general exhibit statistical dependence; therefore multivariate analysis of variance rather than univariate analysis of variance is appropriate, and (b) multivariate analysis of variance assumes that the carryover effect of a treatment or a test on succeeding treatments is constant and does not depend on the nature of the succeeding treatment, i.e., carryover is additive and does not interact with succeeding treatments. Most of this paper is concerned with possible experimental and statistical answers to the questions which arise when dependent measures are used in a continuous treatment design. The problem of carryover effects that interact with subsequent treatments is quite different. No answers to this problem are given here; instead we ask if there is, in fact, any way of preserving the advantages of a cross-over design and obtaining unbiased estimates of the treatment effects when carry-over interaction is present.

AD-A074 102/5 PC **A03**/MF **A01**
Walter Reed Army Inst of Research Washington DC
Some Rank-Order Tests for Trend in a Set of Correlated Means,
Ardie Lubin. Jun 57, 27p

A statistic, J, has been proposed as a test for the differences between a set of n correlated means when m subjects have been subjected to n treatments. The null hypothesis is that all permutations of the n scores for each subject are equally likely. The alternative hypothesis is that there is a trend which can be specified by the experimenter in the form of a theoretical rank-order. The J statistic is the sum of the S(d-squared) values that can be computed between the hypothetical rank-order and the observed rank-order for each of the m subjects. It is therefore equivalent to an average Spearman rank-order correlation. There is no parametric test that can be substituted for the non-parametric trend test.

AD-A074 117/3 Not available NTIS
Illinois Univ at Urbana-Champaign Coordinated Science Lab
Parameter Scaling and Well-Posedness of Stochastic Singularly Perturbed Control Systems,
H. K. Khalil, A. H. Haddad, and B. L. Blankenship. 1979, 6p ARO-13480.8-MX
Contract EX-76-01-2088, Grant DAAG29-76-G-0154
Availability: Pub. in Proceedings of Asilomar Conference on Circuits, Systems and Computers (12th), 6-8 Nov 78, Pacific Grove, CA, p407-411. (No copies furnished by DDC).

No abstract available.

AD-A074 123/1 Not available NTIS
Brown Univ Providence RI Lefschetz Center for Dynamical Systems
Bifurcation from Simple Eigenvalues for Several Parameter Families,
Jack K. Hale. 24 Aug 77, 7p ARO-13915.4-M
Grants DAAG29-76-G-0294, NSF-MCS76-07247
Availability: Pub. in Nonlinear Analysis, Theory, Methods and Applications, v2 n4 p491-497 1978. (No copies furnished by DDC).

No abstract available.

AD-A074 124/9 Not available NTIS
Rochester Univ NY
A Three-Stage Elimination Type Procedure for Selecting the Largest Normal Mean (Common Unknown Variance),
Ajit C. Tamhane. Jun 76, 12p ARO-10003.31-M
Grant DA-ARO-D-31-124-72-G55
Availability: Pub. in Sankhya, the Indian Jnl. of Statistics, Series B, v38 pt-4 p339-349 1976. (No copies furnished by DDC).

No abstract available.

AD-A074 150/4 PC **A07**/MF **A01**
Army Chemical Corps Engineering Command Army Chemical Center MD
Proceedings of the Annual Statistical Engineering Symposium (3rd), Held at Army Chemical Center, Maryland, on May 2-3 1957,
David R. Howes. 3 May 57, 139p

Contents: Experiments with Many Factors; The Derivation of Standard Industrial Ratios of Instrument Accuracy to Design Tolerance Specifications; Statistical Methods in Life Testing; Analysis of Variance Models with Engineering Applications; Two-Sided Tolerance Limits for Normal Distributions Using the Range; On the Choice of Sampling Inspection Plans; Tightened Multi-Level Continuous Sampling Plans; Time as a Response; and Linear Structural Relationships Underlying the Decomposition of Levinstein H.

AD-A074 174/4 PC **A03**/MF **A01**
Army Missile Research and Development Command Redstone Arsenal AL Technology Lab
SAM: An Alternative to Sampled-Data Signal Flow Graphs.
Technical rept.,
S. M. Seltzer. 10 May 79, 37p Rept no. DRDMI-T-79-49

This report describes an alternative to the use of Signal Flow Graphs and Mason's Gain Rule for the analysis of complicated digital control systems. The technique is analytical in nature and makes use of a systematic manipulation of algebraic equations describing the system to be analyzed. The technique is modified to be amenable to a new signal flow graph method for the analyst who prefers using signal flow graphs. Both the analytical technique and the modified signal flow graph technique are applied to examples and compared to a standard signal flow graph technique to display their relative advantages. (Author)

AD-A074 223/9 PC **A04**/MF **A01**
Pittsburgh Univ PA Inst for Statistics and Applications
Estimation of Variance Components.
Interim rept.,
C. Radhakrishna Rao, and Jurgen Kleffe. Jul 79, 63p TR-79-1, AFOSR-TR-79-0974
Contract F49620-79-C-0161

The paper describes a number of methods for estimating variance components in a general linear model. Explicit expressions are obtained for locally minimum variance unbiased estimators with and without the invariance condition. The principle of MINQE is described and a series of MIQE estimators satisfying one or more of the conditions - unbiasedness, invariance, nonnegative definiteness - are derived. Corresponding to each MINQE estimator, an iterated MINQE (IMINQE) is defined. It is shown that the ML (maximum Likelihood) estimator is IMINQE satisfying the invarianc e condition and the RML (restricted maximum likelihood estimator) is IMINQE satisfying both the invariance and unbiasedness conditions. Some comments are made on the numerical alorithms for computing MINQ, ML and RML estimators. (Author)

AD-A074 234/6 PC **A02**/MF **A01**
Illinois Univ at Chicago Circle Dept of Mathematics
Circular Balanced Repeated Measurements Designs.
Interim rept.,
Constantin Magda. Jul 79, 25p AFOSR-TR-79-0973
Grant AFOSR-76-3050

The concept of a circular design is defined and when proper balance for various effects is assumed, its universal optimality is proved over the class of all designs with the same parameters. Such designs are shown to minimize the variance of the best linear unbiased estimators of contrasts of residual and direct effects over the class of equireplicated designs. All models assume first order residual effects and are of circular nature. (Author)

AD-A074 246/0 PC **A02**/MF **A01**
Akron Univ Oh Dept of Mathematical Sciences
A General Approach to Ordering of Parameters with Application in Reliability.
Final rept.,
John C. Conlon. Aug 79, 8p AFOSR-TR-79-0962
Grant AFOSR-78-3670

The reports dealt with the applications of the theory of G-ordered function in reliability; the applications of the theory of G-monotone functions in reliability; and some majorization results for a system of flow. The monograph deals with the topics of partial orderings on N-dimensional space and their use in probability and statistics.

AD-A074 248/6 Not available NTIS
Aeronautical Research Associates of Princeton Inc NJ
A Note on Miura's Transformation,
Mark J. Ablowitz, Martin Kruskal, and Harvey Segur. 13 Jun 77, 5p ARO-15338.2-M
Contract DAAG29-78-C-0003
Prepared in cooperation with Princeton Univ., NJ. Program in Applied Mathematics.
Availability: Pub. in Jnl. of Mathematics and Physics, v20 n6 p999-1003 Jun 79 (No copies furnished by DDC).

No abstract available.

AD-A074 257/7 PC **A02**/MF **A01**
Purdue Univ Lafayette IN Dept of Statistics
Probability and Statistics and Applications.
Final scientific rept. 1 Jun 77-31 May 79,
Leon Jay Gleser, and David S. Moore. Jul 79, 11p AFOSR-TR-79-0961
Grant AFOSR-77-3291

This final report reviews the following work: minimax estimation of the mean vectors of multivariate normal distributions and of the slopes of multivariate linear regression models when the error covariance matrix is unknown; minimax properties of generalized ridge regression estimators of regression coefficients in the classical linear model; improvements on inadmissible simultaneous estimators for the parameters of k discrete populations; Bayes multiple comparison procedures in two factor ANOVA designs; calculations of and properties of point and interval estimators of slope parameters in multivariate errors in variables regression models (linear functional equations); asymptotic pointwise optimal and asymptotically optimal sequential Bayes regional estimators for functions of a vector parameter; chi-square goodness-of-fit tests for censored data and for multivariate normality; and the general theory and application of chi-square tests. A bibliography of publications, reports, and dissertations supported by the grant is provided.

AD-A074 258/5 PC **A02**/MF **A01**
Kansas Univ Lawrence Dept of Mathematics
Stochastic Filtering and Control.
Interim rept. 16 May 78-15 May 79,
Tyrone E. Duncan. May 79, 11p AFOSR-TR-79-0981
Grant AFOSR-77-3177

The topology of the space of minimal transfer functions has been studied with particular emphasis on symmetric transfer functions and a number of important new results have been obtained. Understanding the topology of the space of transfer functions is important in the development of identification algorithms and symmetric transfer functions arise in the description of many physical systems. The problem of state space realization of transfer functions for systems with delays has also been studied and useful results have been obtained. The problems of deterministic control, stochastic filtering and stochastic control have been studied for linear pure delay time systems. A geometric approach has been used which has simplified previous results and has obtained new results. In addition, preliminary investigations of some other related research areas has commenced. (Author)

AD-A074 285/8 Not available NTIS
Tennessee Univ Knoxville Dept of Computer Science
Positive Diagonal Solutions to the Lyapunov Equations,
G. P. Barker, A. Berman, and R. J. Plemmons. 9 Mar 76, 8p ARO-13374.1-A-M
Contract DAHC04-74-C-0019
Prepared in cooperation with Wisconsin Univ., Madison, Mathematics Research Center, Contract DAAG29-75-C-0024.
Availability: Pub. in Linear and Multilinear Algebra, v5 p249-256 1978 (No copies furnished by DDC).

No abstract available.

AD-A074 309/6 Not available NTIS
Iowa State Univ Ames Statistical Lab
Nonparametric Minimax Estimation of the Mean,
Glen Meeden, and Malay Ghosh. 1976, 6p ARO-11259.16-M
Grant DA-ARO-D-31-124-73-G55
Availability: Pub. in Calcutta Statistical Association Bulletin, v25 nos97-100 p169-173 Mar, Jun, Sep and Dec 76 (No copies furnished by DDC).

No abstract available.

AD-A074 318/7 PC **A03**/MF **A01**
Brown Univ Providence RI Lefschetz Center for Dynamical Systems
Asymptotic Properties of Stochastic Approximations with Constant Coefficients.
Interim rept.,
Harold J. Kushner, and Hai Huang. Apr 79, 46p LCDS-TR-79-2, AFOSR-TR-79-0977
Contract N00014-76-C-0279, Grant AFOSR-76-3063
Sponsored in part by Grant NSF-ENG77-12946.

No abstract available.

AD-A074 330/2 Not available NTIS
Wisconsin Univ-Madison
Improper Priors, Spline Smoothing and the Problem of Guarding against Model Errors in Regression,
Grace Wahba. Feb 78, 10p ARO-14891.1-M
Grant DAAG29-77-G-0207
Availability: Pub. in the Jnl. of the Royal Statistical Society Series B (Methodological), v40 n3 p364-372 1978 (No copies furnished by DDC).

No abstract available.

AD-A074 339/3 PC **A03**/MF **A01**
Case Western Reserve Univ Cleveland OH Dept of Mathematics and Statistics
Confidence Intervals for the Common Variance of Equicorrelated Normal Random Variables.
Technical rept.,
P. F. Ramig, and S. Zacks. 1 Aug 79, 33p Rept no. TR-37
Contract N00014-75-C-0529

Confidence intervals for the common variance of equicorrelated normal random variable are investigated. When the correlation coefficient is unknown no uniformly most accurate invariant confidence interval for the common variance exists. We develop interval estimators which are based on the asymptotically most efficient ones by employing the best asymptotic normality of the maximum likelihood estimators. In addition to their comparison with possible competitors, their small sample efficiency is studied. A method for determining exact coverage probabilities and expected length is developed. As a result of these investigations we concluded that interval estimators based on maximum likelihood estimators are to be recommended.

AD-A074 341/9 Not available NTIS
Carnegie-Mellon Univ Pittsburgh PA Dept of Mathematics
Wang Algebra and Matroids,
Richard J. Duffin, and T. D. Morley. 9 Dec 77, 8p ARO-13966.7-M
Grant DAAG29-77-G-0024
Availability: Pub. in IEEE Transactions on Circuits and Systems, vCAS-25 n9 p755-762 Sep 78 (No copies furnished by DDC).

No abstract available.

AD-A074 373/2 Not available NTIS
Rochester Univ NY
Subset Selection Procedures for Normal Means under Unequal Sample Sizes,
Hubert J. Chen, Edward J. Dudewicz, and Young Jack Lee . May 75, 8p ARO-10003.23-M
Grant DA-ARO-D-31-124-72-G55
Prepared in cooperation with Georgia Univ., Athens, Ohio State Univ., Columbus, Maryland Univ., College Park, and National Cancer Inst., Bethesda, MD.
Availability: Pub. in Sankhya, the Indian Jnl. of Statistics, Series B, v38 pt-3 1976 (No copies furnished by DDC).

No abstract available.

LA-7870-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Block Relaxation Techniques for Finite-Element Elliptic Equations: An Example.
D. L. Boley, and S. V. Parter. Jun 79, 19p
Contract W-7405-ENG-36

The Ritz--Galerkin equations for the numerical solution of the two-point boundary-value problem u'' = f, o less than or equal to x less than or equal to 1, u(o) = u(1) = 0, are considered. Ritz--Galerkin subspaces of hermite cubic splines with equally spaced knots are examined. These equations are

then solved via iterative methods. The rate of convergence of these methods is estimated. (ERA citation 04:050916)

N79-32029/7 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
The Generalized Pole Assignment Problem.
T. E. Djaferis, and S. K. Mitter. Sep 79, 8p
NASA-CR-162268, LIDS-P-944
Contracts NGL-22-009-124, E(49-18)-2087

Two dynamic output feedback problems for a linear, strictly proper system are considered, along with their interrelationships. The problems are formulated in the frequency domain and investigated in terms of linear equations over rings of polynomials. Necessary and sufficient conditions are expressed using genericity.

N79-32030/5 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
A Multiloop Generalization of the Circle Criterion for Stability Margin Analysis.
M. G. Safonov, and M. Athans. 1 Sep 79, 32p
NASA-CR-162267, LIDS-P-946
Contract NGL-22-009-124, Grant NSG-1312

In order to provide a theoretical tool suited for characterizing the stability margins of multiloop feedback systems, multiloop input-output stability results generalizing the circle stability criterion are considered. Generalized conic sectors with 'centers' and 'radii' determined by linear dynamical operators are employed to specify the stability margins as a frequency dependent convex set of modeling errors (including nonlinearities, gain variations and phase variations) which the system must be able to tolerate in each feedback loop without instability. The resulting stability criterion gives sufficient conditions for closed loop stability in the presence of frequency dependent modeling errors, even when the modeling errors occur simultaneously in all loops. The stability conditions yield an easily interpreted scalar measure of the amount by which a multiloop system exceeds, or falls short of, its stability margin specifications.

N79-32033/9 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Concerning an Application of the Method of Least Squares with a Variable Weight Matrix.
A. A. Sukhanov. Sep 79, 29p NASA-TM-75669, PR-481
Contract NASW-2791
Tran-Transl. Into English of "O Primenenii Metoda Naimenshikh Kvadratov S Peremennoy Vesovoy Matritsyey" Acad. Of Sci. USSR, Moscow, Rept. Pr-481, 1979 33 p. Subm-Transl. By Scientific Translation Service, Santa Barbara, Calif.

An estimate of a state vector for a physical system when the weight matrix in the method of least squares is a function of this vector is considered. An iterative procedure is proposed for calculating the desired estimate. Conditions for the existence and uniqueness of the limit of this procedure are obtained, and a domain is found which contains the limit estimate. A second method for calculating the desired estimate which reduces to the solution of a system of algebraic equations is proposed. The question of applying Newton's method of tangents to solving the given system of algebraic equations is considered and conditions for the convergence of the modified Newton's method are obtained. Certain properties of the estimate obtained are presented together with an example.

ORNL/CSD/TM-67 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
FORTRAN Subroutines for Bicubic Spline Interpolation.
P. W. Gaffney. Jul 79, 33p
Contract W-7405-ENG-26

FORTRAN subroutines for computing a bicubic spline function which interpolates values of a function u on a rectangular grid are presented. 3 figures. (ERA citation 04:050919)

PB80-104045 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Constructed Facilities Div.
Computation of Hankel Transforms Using the Fast-Fourier Transform Algorithm,
E. Kausel, and G. Bouckovalas. Aug 79, 49p
R79-12, NSF/RA-790206
Grant NSF-ENV77-18339

An efficient numerical procedure is presented for the computation of Hankel transforms. The algorithm is based on the expression of the Hankel Transform in terms of a two-dimensional Fourier Transform, which is then reduced to only one dimension. The latter is then evaluated with the fast Fourier Transform algorithm. Examples are presented, and a listing of the computer program included.

SAND-79-0586C PC **A02**/MF **A01**
Wisconsin Univ.-La Crosse. Dept. of Mathematics.
Simply Sequential and Graceful Graphs.
D. W. Bange, A. E. Barkauskas, and P. J. Slater. 1979, 8p CONF-790482-1
Contract EY-76-C-04-0789
10. S.E. conference on combinatorics, graph theory and computing, Boca Raton, FL, USA, 2 Apr 1979.

The concept of a simply sequential graph is introduced as follows. A graph G with V(G) U E(G) = k is called simply sequential if there is a bijection h:V(G) U E(G) implies (1,2...,k) such that for each edge e = xy in E(G) one has h(e) = h(x) - h(y). Several problems concerning graceful and simply sequential graphs are discussed. In particular, it is conjectured that all trees are simply sequential. 5 figures. (ERA citation 04:050922)

12B. Operations Research

AD-A073 840/1 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
How to be Efficient - A Simple Introduction to 'Optimization',
Fan Chin. 6 Dec 78, 14p Rept no. FTD-ID(RS)T-2108-78
Edited trans. of Hang K'ung Chih Shih (China) n4 p33-35 Apr 78.

No abstract available.

AD-A073 929/2 PC **A03**/MF **A01**
Carnegie-Mellon Univ Pittsburgh PA Management Sciences Research Group
Some n by dn Linear Complementarity Problems Solvable by a Principal Pivoting Algorithm with Applications.
Management sciences research rept.,
Ikuyo Kaneko, and Jong-Shi Pang. Apr 79, 39p
Rept nos. MSRR-435, WP-59-78-79
Contract N00014-75-C-0621, Grant NSF-ENG77-11136
Prepared in cooperation with Wisconsin Univ., Madison.

The purpose of this paper is to study some recent applications of the n by dn LCP solvable by a parametric principal pivoting algorithm (PPP algorithm). First, it is shown that by analyzing the n by dn LCP we could study the problem of solving a system of equations and the (nonlinear) complementarity problem when the function involved is separable. Next, we examine conditions under which the PPP algorithm is applicable to a general LCP, and then present examples of LCP's arising from various applications satisfying the conditions; included among them is the n by dn LCP with a certain P-property. Finally we study a special class of n by dn LCP's which do not possess the P-property but to which the PPP algorithm is still applicable; a major application of this class of problems is a certain economic spatial equilibrium model with piecewise linear prices. (Author)

AD-A073 967/2 PC **A03**/MF **A01**
Massachusetts Inst of Tech Cambridge Operations Research Center
Linear Multiple Objective Problems with Interval Coefficients.
Technical rept.,
Gabriel R. Bitran. Aug 79, 26p Rept no. TR-167
Contract N00014-75-C-0556

This paper considers linear multiple objective programs with coefficients of the criteria given by intervals. This class of problems is of practical interest since in many instances it is difficult to determine precisely the coefficients of the objective functions. A subproblem to test if a feasible extreme point is efficient in the problem considered is obtained. A branch and bound algorithm to solve the subproblem as well as computational results are provided. Extensions are discussed.

AD-A074 335/1 Not available NTIS
California Univ Berkeley Electronics Research Lab
A Second-Order Method for the General Nonlinear Programming Problem,
H. Mukai, and E. Polak. 1978, 18p ARO-11260.8-M
Contract DAAG29-73-C-0025, Grant NSF-ENG73-08214
Availability: Pub. in Jnl. of Optimization Theory and Applications, v26 n4 p515-532 Dec 78. (No copies furnished by DDC).

No abstract available.

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

ANL/CNSV-2 PC **A19**/MF **A01**
Argonne National Lab., IL.
Integrated Community Energy Systems: Engineering Analysis and Design Bibliography.
J. M. Calm, and G. R. Sapienza. May 79, 427p
Contract W-31-109-ENG-38

This bibliography cites 368 documents that may be helpful in the planning, analysis, and design of Integrated Community Energy Systems. It has been prepared for use primarily by engineers and others involved in the development and implementation of ICES concepts. These documents include products of a number of Government research, development, demonstration, and commercialization programs; selected studies and references from the literature of various technical societies and institutions; and other selected material. The key programs which have produced cited reports are the Department of Energy Community Systems Program (DOE/CSP), the Department of Housing and Urban Development Modular Integrated Utility Systems Program (HUD/MIUS), and the Department of Health, Education, and Welfare Integrated Utility Systems Program (HEW/IUS). The cited documents address experience gained both in the U.S. and in other countries. Several general engineering references and bibliographies pertaining to technologies or analytical methods that may be helpful in the analysis and design of ICES are also included. The body of relevant literature is rapidly growing and future updates are therefore planned. Each citation includes identifying information, a source, descriptive information, and an abstract. The citations are indexed both by subjects and authors, and the subject index is extensively cross-referenced to simplify its use. (ERA citation 04:048872)

BMFT-FBT-79-02 PC **A11**/MF **A01**
Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (Germany, F.R.).
Development and Preparative Measures for Serial Production of a Modular Solar Domestic Heating System.
R. Eichlepp, H. Grallert, V. Merges, and K. H. Ott. May 79, 248p
In German.
U.S. Sales Only.

During the first development phase, detailed technical and economic system analyses have been made which were initial points for the necessary component development. These analyses comprised an estimation of weather influence, a conceptional study, investigations of all collector off-design parameters, control, characteristics of energy demand, system cost estimate and optimization, complete simulation of the solar thermal and conventional heating circle, and thermal and mechanical calcuations of each component. (ERA citation 04:048333)

BNL-26242 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.

Public Data Sources and Modeling of District Heating in the United States.
J. Karkheck, and R. G. Tessmer, Jr. 1979, 4p
CONF-790672-1
Contract EY-76-C-02-0016
International symposium on modeling, planning, and decision in energy systems, Montreux, Switzerland, 19 Jun 1979.

A methodology for computerized modelling of hot water district heating service in any urban area in the United States is described. It is distinguished by the depth and breadth of its data bases, the ease with which any urban market can be analyzed and the wide variety of intermediate information which is obtained. Real housing and employment data, canvassed for the entire nation and made available on a very small area basis, are conjoined with local climate profiles, labor costs, land use intensity factors, fuel prices and fuel use profiles to generate profiles of heating demands and markets for district heat. This characterization of residential and commercial space and water heating demands permits a system design and costing of piping systems for distribution of hot water, subject to any penetration constraints imposed. A minimal number of assumptions are needed to generate these products from the data bases, many of which were generated in the public domain for other purposes. (ERA citation 04:048505)

BNL-50887 PC **A07**/MF **A01**
Brookhaven National Lab., Upton, NY.
Documentation of an Interactive Program for Projecting Space Heating Energy Demand (IPPSHED).
D. Schneider. Aug 78, 142p
Contract EY-76-C-02-0016

The model presented here is designed to be a tool for analyzing the effects of conservation strategies in reducing building energy demands. The purpose of the model is to project residential space heating demands for defined structural types. The user obtains energy demand projections, interactively, for different geographic regions. These energy demands are derived by incorporating theoretical building energy loads, projected housing and fuel mixes, and the efficiencies of both the structures and the conversion devices. The User's Guide in Appendix A contains the necessary information for running the model. This section will be published as a separate report. (ERA citation 04:048515)

CONF-790541-19 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Manufactured Solar Home.
M. P. Scofield, A. S. Lau, K. H. Liebelt, and N. R. Shinn. 1979, 6p
Contract EY-76-C-07-1570
International Solar Energy Society meeting, Atlanta, GA, USA, 28 May 1979.

Two nearly identical manufactured solar houses were designed and built in Idaho. The solar system was designed to be eventually offered as an option on any home manufactured by Boise Cascade. The active solar heating and cooling system uses simple air collectors, rock storage, and a heat exchanger to preheat hot water. Summer cooling is provided by blowing cool, night air through the rock bed and then circulating house air through the cool rocks as needed. Both houses are being monitored for two years to obtain dynamic heating and cooling system performance. The data will be used to modify computer models such as TRNSYS to obtain more accurate performance predictions. Initial predictions of performance and cost indicate that positive monthly savings will be achieved. (ERA citation 04:046213)

CONF-790678-1 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Reducing Residential Energy Growth with More Efficient Space Heating Equipment.
D. L. O'Neal, and E. Hirst. 1979, 26p
Contract W-7405-ENG-26
ASHRAE society meeting, Detroit, MI, USA, 24 Jun 1979.

Several energy-saving design changes in residential space heating systems were examined to determine their energy conservation potential and cost effectiveness. Changes in conventional and advanced systems (such as gas heat pumps) were considered. Energy savings as large as 26, 20, and 57% were estimated for design changes in conventional gas, oil, and electric space heating systems, respectively. These changes increased capital cost of the three systems by 27, 16, and 26%. For advanced gas and electric systems, energy savings up to 45 and 67%, respectively, were calculated. The design changes needed to produce these energy savings increased capital costs 80 and 35%. The energy use and cost relationships developed for the space heating systems were used as input to the ORNL residential energy use simulation model to evaluate the effect of space heating improvements on national energy use to the year 2000. Results indicated a large reduction in energy use if improved conventional and advanced systems were made available to consumers and if consumers minimized lifecycle costs when purchasing these systems. (ERA citation 04:048826)

COO-4218-2 PC **A06**/MF **A01**
Curtiss-Wright Corp., Wood-Ridge, NJ. Nuclear Div.
Conceptual Designs and Cost Estimates of Mechanical Draft Wet/Dry and Natural Draft Dry Cooling Systems Using Curtiss-Wright Integral Fin-Tube Heat Exchangers.
R. J. Haberski, and J. C. Bentz. Apr 79, 107p
CW-WR-79-010
Contract EN-77-C-02-4218

This study was performed to establish a conceptual design and cost evaluation of an advanced technology mechanical draft wet/dry and natural draft dry cooling systems for large electric power plants using a high performance integral fin-tube heat transfer surface. This study was part of an overall DOE program to develop and demonstrate advanced concept cooling systems for large electric power plants. The results obtained show significant economic advantages compared to results previously published for conventional cooling systems. These advantages are due to the higher heat transfer and lower pressure loss which occur with the use of the selected multi-port integral fin-tubes. (ERA citation 04:048516)

COO-4297-1 PC **A03**/MF **A01**
EIC Corp., Newton, MA.
Corrosion Protection of Solar-Collector Heat Exchangers with Electrochemically Deposited Films. First Semi-Annual Report, May 15--November 30, 1978.
S. B. Brummer, V. R. Koch, and G. H. Schnaper. Jan 79, 44p
Contract EM-78-C-04-4297

Work on this program involves the demonstration of a novel corrosion protection technique for the common solar collector metals: Al, Cu, and Fe as mild steel. This involves the potentiostatic electrochemical deposition of thin, adherent polymer films on the interior of heat-exchanger tubes by application of a current in the presence of a suitable dissolved organic monomer. Anodic film formation on Al can only take place in the absence of its Al sub 2 O sub 3 coating. The Zn immersion process effectively replaces the oxide with a thin coating of Zn. Subsequent electroorganic monomer polymerization thus ensues on a Zn surface. Tetramethylphenol (TMP) has been shown to film Al/Zn samples, and ESCA and infrared analysis reveal a methylated polyphenylene oxide polymer although complete coverage was not achieved. Copper and iron readily accomodate dimethylphenol (DMP) and metaphenylenediamine (MPD) as well as TMP films. As in the case of Al, holidays or cracks in the film were apparent via ESCA analysis thus precluding good corrosion protection. (ERA citation 04:048456)

COO-4577-7 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Optimization of Photovoltaic/Thermal Collector Heat Pump Systems.
M. C. Russell, and E. C. Kern, Jr. 1979, 5p
CONF-790541-20
Contract EG-77-S-02-4577
International Solar Energy Society meeting, Atlanta, GA, USA, 28 May 1979.

Combined photovoltaic/thermal (PV/T) collectors convert insolation directly to both electrical and thermal energy. These collectors are potentially less costly and have smaller space requirements than equivalent separate collectors operating to satisfy residential heating, cooling, hot water and electrical power demands. TRNSYS simulation of PV/T collector-heat pump systems for residences in New York and Fort Worth climates, and analysis of the technical and economic results are discussed. The parallel heat pump configuration with 40 square meters of PV/T collectors was found to be the least-cost system option for the New York residence. (ERA citation 04:049740)

DOE/ET/27139-1 PC **A06**/MF **A01**
Washington State Univ., Pullman. Environmental Research Center.
Comparison of Geothermal Energy with Coal, Oil, and Natural Gas for Selected Uses.
G. W. Hinman, and J. Robertson. 1979, 102p
RLO-2221-T14-1
Contract EY-76-S-06-2221-014

Environmental effects and energy efficiencies for geothermal energy, western strip-mined coal, and eastern underground mined coal applied to space heating, process heat, and electric drive were compared. The measure of an environmental effect is the amount of residual material released to the environment, and the measure of energy efficiency is the second law efficiency of the process involved. The results indicate that geothermal energy efficiencies (second law) are higher than those for coal for all three end uses. The environmental effects for geothermal supply systems are smaller than those for coal in the cases of space heat and process heat and are comparable in the case of electric drive. The optimum allocation of a finite geothermal resource and a finite coal resource between space heat and electric drive has been evaluated from the viewpoint of maximum end use service. The results indicate that, to the extent that locational factors permit, geothermal energy should be used for space heat and coal for electric drive. (ERA citation 04:050266)

DOE/NASA/CR-161228 PC **A04**/MF **A01**
Contemporary Systems, Inc., Jaffrey, NH.
Solar Heating System Final Design Package.
May 79, 70p
Contract EX-76-A-29-1037

Contemporary Systems has taken its Series V Solar Heating System and developed it to a degree acceptable by local codes and regulatory agencies. The system is composed of the Series V warm air collector, the LCU-110 logic control unit and the USU-A universal switching and transport unit. The collector was originally conceived and designed as an integrated roof/wall system and provides a dual function in the structure. The collector serves both as a solar energy conversion system and as a structural weather resistant skin. The collector can be fabricated in any length from 12 to 24 feet. This provides maximum flexibility in design and installation. The LCU-110 control unit provides totally automatic control over the operation of the system. It receives input data from sensor probes in collectors, storage and living space. The logic is designed so as to make maximum use of solar energy and minimize use of conventional energy. The USU-A transport and switching unit is a high-efficiency air-handling system equipped with gear motor valves that respond to outputs from the control system. The fan unit is designed for maximum durability and efficiency in operation, and has permanently lubricated ball bearings and excellent air-handling efficiency. (ERA citation 04:048335)

DOE/NASA/CR-161238 PC **A03**/MF **A01**
South Dakota School of Mines and Technology, Rapid City.
Solar Energy System Installed at Mount Rushmore National Visitor Center in Keystone, South Dakota.
Jun 79, 42p
Contracts EX-76-A-29-1024, EX-76-C-01-239

Information is provided on the system description, the design, and installation of the solar energy system installed at the Mount Rushmore Visitor Center. The system is designed to furnish about 45 percent of the heating for the total facility and about 53 percent partial cooling for the 2000 square-foot observatory. Such items as Accept-

ance Test Data, a complete set of as-build drawings, system performance data, problems, pictures, and other pertinent materials are included. (ERA citation 04:048336)

DOE/TIC-10506 PC **A03**/MF **A01**
American Association of School Administrators, Arlington, VA.
Public Schools Energy Conservation Measures: Washington Elementary School, Kennewick, Washington. Report No. 10.
24 Jan 77, 39p

A comprehensive energy analysis was made of the Washington Elementary School in Kennewick, Washington in order to identify cost-effective energy conservation opportunities. The energy conservation measures recommended for this 20 year old building included added roof insulation, reduction in glassed areas, replacement of incandescent lighting, and mechanical adjustments and maintenance. The total cost of these measures is estimated to be $80,425 with a 7 1/2 year payback period. (ERA citation 04:048833)

DOE/TIC-10507 PC **A03**/MF **A01**
American Association of School Administrators, Arlington, VA.
Public Schools Energy Conservation Measures. Report Number 6: P.F. Brown Elementary School, Lubbock, Texas.
24 Jan 77, 40p

An engineering analysis of ten representative elementary schools across the nation was undertaken to identify cost-effective energy conserving opportunities. Emphasis was placed on the cost effectiveness of capital modifications utilizing available hardware. The project was designed in 5 phases: (1) select the ten elementary school buildings and analyze their energy conserving opportunities, (2) undertake needed architectural or engineering design work, (3) install or construct recommended modifications, (4) monitor and record post-modification energy use, and (5) disseminate the findings. This report on P.F. Brown Elementary School in Lubbock, Texas, represents the culmination of Phase 1 for one the sites chosen. The building description, data collection, energy conservation opportunities, and economic evaluation for the school are discussed. (ERA citation 04:048834)

DOE/TIC-10508 PC **A03**/MF **A01**
American Association of School Administrators, Arlington, VA.
Public Schools Energy Conservation Measures, Hindman Elementary School, Hindman, Kentucky. Report No. 4.
24 Jan 77, 41p

The study identifies and evaluates energy conserving opportunities for the Hindman Elementary School. The evaluation procedure includes a field survey, computer analysis, and cost estimate. A building description, data collection procedures and a description of energy conservation possibilities (boiler, temperature controls, electrical, and building modifications) are presented. (ERA citation 04:048835)

DOE/TIC-10513 PC **A06**/MF **A01**
JRB Associates, Inc., McLean, VA.
Conduct EMS Cost Analysis and Preliminary Design.
23 May 77, 117p

Cost-effective Energy Management Systems (EMS) for small Federal buildings are evaluated and recommended. The energy usage and costs in these model buildings were estimated using a computer model. The cost of installing commercially available energy management equipment was estimated for each building and HVAC system type. These figures were used to perform economic analyses of the viability of commercial EMS's in small Federal buildings, defined as any building less than 200,000 sq. ft. New digital technology was explored and an estimate of how the cost of energy management in small buildings could be lowered was made. These lowered costs were then used to re-estimate the range of buildings to which EMS's can be economically applied. (ERA citation 04:048836)

DOE/TIC-10514 PC **A04**/MF **A01**
American Association of School Administrators, Arlington, VA.
Public Schools Energy Conservation Measures. Report No. 9, Plover Whiting Elementary School, Stevens Point, Wisconsin.
24 Jan 77, 65p

The Federal Energy Administration and American Association of School Administrators co-sponsored a project called Saving Schoolhouse Energy aimed at determining the cost effectiveness of retrofitting schools, principally with "off-the-shelf" hardware, to affect energy conservation. The results of a field investigation, computer simulation and evaluation of the energy conservation opportunities for an elementary school in Stevens Point, Wisconsin, are presented. It was estimated that rescheduling lighting and air conditioner usage, resetting indoor air temperatures, and reducing air infiltration at a total cost of less than $4000 would save energy costs of an equal amount in 1 year's time. (ERA citation 04:048837)

DOE/TIC-10515 PC **A04**/MF **A01**
American Association of School Administrators, Arlington, VA.
Public Schools Energy Conservation Measures. Report Number 8. Garfield Elementary School, Sioux Falls, South Dakota.
24 Jan 77, 57p

Energy conserving opportunities for the Garfield Elementary School, Sioux Falls, South Dakota, are identified and evaluated. The analysis is a part of the first phase of a five-part program. The report summarizes the results of the field investigations, computer simulations, and evaluations of the opportunities. (ERA citation 04:048838)

DOE/TIC-10549 PC **A04**/MF **A01**
American Association of School Administrators, Arlington, VA.
Public Schools Energy Conservation Measures. Report No. 7, Eastridge Elementary School, Lincoln, Nebraska.
24 Jan 77, 54p

The Federal Energy Administration and the American Association of School Administrators co-sponsored a project called Saving Schoolhouse Energy aimed at determining the cost effectiveness of retrofitting schools, principally with "off-the-shelf" hardware, to effect energy conservation. The results of a field investigation, computer simulation and evaluation of the energy conservation opportunities for an elementary school in Lincoln, Nebraska, are presented. It was estimated that at a cost of $10,000 airflow controls and night setback thermostat controls would have a payback period of six years. (ERA citation 04:050273)

DOE/TIC-10774 PC **A02**/MF **A01**
Federal Energy Administration, Washington, DC.
Proposed Energy Conservation Contingency Plan: Emergency Restrictions on Advertising Lighting. Authorities, Need, Rationale, and Operation.
Apr 77, 25p

The emergency restrictions on advertising lighting proposed in Energy Conservation Contingency Plan No. 5 of 1977 are presented. A statement is given on the need for rationale and operation of the Contingency Plan. (ERA citation 04:048840)

HCP/M4131-01 PC **A99**/MF **A01**
Alabama Univ. in Huntsville. Kenneth E. Johnson Environmental and Energy Center.
Pre-Printed Papers of the Second Solar Heating and Cooling Commercial Demonstration Program Contractors' Review.
Nov 78, 758p CONF-781220-
Contract EC-78-C-01-4131
Second solar heating and cooling commercial demonstration program contractor's review, San Diego, CA, USA, 13 Dec 1978.

Separate abstracts were prepared for each of the 115 included papers. (ERA citation 04:048337)

LA-UR-79-1336 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Characterization of Crushed Glass as a Transpired Air Heating Solar Collector Material.
R. K. Collier. 1979, 6p CONF-790541-7
Contract W-7405-ENG-36
International Solar Energy Society meeting, Atlanta, GA, USA, 28 May 1979.

The use of crushed glass matrices as the heat-absorbing media in air heating solar collectors is investigated. An experimantal program was undertaken to characterize the most likely candidate glass types and sizes by measuring pressure drops, optical extinction coefficients, and volumetric heat transfer coefficients. Bed efficiencies were also measured and found to be similar to those expected for screen matrices unless critical amounts of clear glass were used as a top layer, which results in lower efficiency. (ERA citation 04:048458)

LA-7781-PR PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Magnetic Refrigerator Development. Progress Report, December 1, 1978--February 28, 1979.
J. A. Barclay, W. A. Steyert, and D. R. Zrudsky.
Aug 79, 12p
Contract W-7405-ENG-36

The objectives of this program are to develop new, low-cost, high-efficiency, magnetic refrigeration methods for cooling large superconducting devices of interest to the electric power industry. During this quarter, testing of the refrigerator was begun. Initial tests with no magnetic field are reported, as are tests taken with a modest applied field. In these preliminary tests, the unit pumped heat over a 9 exp 0 C span, and over a 7 exp 0 C span, it pumped 0.5 kW. The unit was also successfully operated as a heat engine. (ERA citation 04:050431)

LBL-9380 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Variable Ventilation Control Systems: Saving Energy and Maintaining Indoor Air Quality.
I. Turiel, C. D. Hollowell, and B. E. Thurston. Jun 79, 9p CONF-791009-5
Contract W-7405-ENG-48
International conference on energy use management, Los Angeles, CA, USA, 22 Oct 1979.

Mechanical ventilation systems usually provide a fixed quantity of fresh air to a building space based upon the maximum number of people expected to occupy that particular space. When the use of a building space is below its design maximum, the amount of outside air brought into that space can be reduced, thus generally also reducing energy consumption through lower heating and cooling loads. One method of determining the necessary ventilation rate for a particular space is to utilize an air quality detector (e.g., CO sub 2 or O sub 2) sensitive to building occupancy and activity load. The output of this detector can in turn be used to control ventilation rates. (ERA citation 04:050274)

LBL-9381 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Air-to-Air Heat Exchangers: Saving Energy and Improving Indoor Air Quality.
G. D. Roseme, C. D. Hollowell, A. Meier, A. Rosenfeld, and I. Turiel. Jun 79, 8p CONF-791009-2
Contract W-7405-ENG-48
International conference on energy use management, Los Angeles, CA, USA, 22 Oct 1979.

Some houses currently built have substantially reduced air infiltration rates to conserve heating and cooling energy use. Indoor air quality problems associated with this large reduction in ventilation air have become apparent. The paper describes the use of mechanical ventilation coupled with heat recovery devices in residential buildings to maintain acceptable indoor air quality and conserve energy. Estimates of energy and peak power savings are given. (ERA citation 04:050269)

LBL-9382 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Effect of Reduced Ventilation on Indoor Air Quality and Energy Use in Schools.
J. V. Berk, C. D. Hollowell, C. Lin, and I. Turiel. Jun 79, 9p CONF-791009-4
Contract W-7405-ENG-48
International conference on energy use management, Los Angeles, CA, USA, 22 Oct 1979.

The indoor air quality in an air conditioned California high school has been measured over a variety

of ventilation rates ranging from 13.3 ft exp 3 of outside air per minute for each classroom occupant to approximately 1.5 cfm per occupant. The purpose of this pilot study was to determine the effect of reduced ventilation on indoor air quality and energy use. Parameters measured include outside air supply rate, the occupants' subjective perception of indoor air quality, airborne microbes, carbon dioxide, carbon monoxide, nitrogen oxides, sulfur dioxide, and ozone in two classrooms, a hall, and outdoors. Carbon dioxide was the only parameter to show a substantial increase in indoor concentration when the ventilation rate was reduced; however, classroom levels still remained far below levels considered to be a health hazard. This study indicates that moderate energy savings are possible at Carondelet High School without significant deterioration of indoor air quality, and that substantial energy savings would be possible in a more severe climatic region. (ERA citation 04:050275)

ORNL/Sub-7504/3 PC **A04**/MF **A01**
Tennessee Technological Univ., Cookeville. Dept. of Engineering Science and Mechanics.
Recessed Light Fixture Test Facility.
D. W. Yarbrough, K. T. Yoo, and P. B. Koneru. Jul 79, 55p
Contract W-7405-ENG-26

Test results are presented for the operation of recessed light fixtures in contact with loose fill cellulose insulation. Nine recessed fixtures were operated at different power levels in attic sections in which loose fill cellulose was purposely misapplied. Cellulose insulation was introduced into the ceiling section by pouring to depths of up to nine inches. Maximum steady state temperatures were recorded for 485 combinations of the variables insulation depth, fixture power, and attic temperature. Results are included for operation of fixtures in the absence of cellulose and with barriers to provide needed clearance between the cellulose insulation and the powered fixtures. Observed temperatures on the electrical power cable attached to a fixture and ceiling joists adjacent to powered fixtures are reported. Examination of the data shows excess operating temperatures are encountered when powered fixtures are covered by three inches of loose fill insulation. Dangerous temperatures resulting in fires in some cases were recorded when covered fixtures were operated at above rated power levels. A preliminary analysis indicates that ceiling side heat transfer accounts for 85 to 90% of the heat dissipation from powered fixtures covered by three inches of loose fill cellulosic insulation. (ERA citation 04:050455)

ORNL/TM-6878 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Effects of Alternate Fuels Report No. 7: Analysis of Failure of a Mullite-Based Refractory Brick in an Industrial Oil-Fired Burner.
J. I. Federer, and V. J. Tennery. Jul 79, 32p
Contract W-7405-ENG-26

Industrial conversion from natural gas to alternate fuels, such as residual oils and coal, often results in accelerated degradation of refractory materials due to chemical reactions with the metal impurities in the alternate fuels. The cause of failure of a refractory brick used in an industrial burner firing an alternate fuel is described. The burner, which was used to calcine CaSO sub 4 in a lime-type kiln, was fired with No. 6 residual oil. The refractory lining in the burner was constructed of aluminosilicate brick, castable, and mortar in contact with one another. The lining deteriorated after about 1000 h, during which the maximum hot-face temperature was about 1750 exp 0 C. The degraded refractories were subjected to chemical analyses, ceramography, x-ray diffraction, scanning electron microscopy, and electron microprobe analysis. Liquid phases that formed in the castable and mortar during operation of the burner at temperatures above about 1600 exp 0 C reacted with the brick, resulting in decomposition of mullite. Contamination of the original refractory with CaO and V sub 2 O sub 5 resulted in the formation, during cooling, of compounds which are less refractory than the original castable and mortar. It was concluded that failure was initiated by melting in the castable and mortar. Large concentrations of aggressive oxide liquid were in the burner lining at the service temperature. The liquid phase eventually advanced into the refractory from the hot face to the extent that the brick grossly deteriorated. Therefore, rapid degradation of the refractory system was due to a combination of excess temperature and fluxing by process carry-over and impurities from the fuel oil. (ERA citation 04:049009)

SERI/TR-34-090 PC **A09**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Simulations and Economic Analyses of Desiccant Cooling Systems.
B. C. Shelpuk, D. W. Hooker, G. J. Jorgensen, and C. E. Bingham. Jun 79, 197p
Contract EG-77-C-01-4042

The progress to date in the development and analysis of computer simulations of solar-powered desiccant cooling using an axial-flow disc-type dehumidifier wheel, solar-powered space heating, and electrically driven, standard vapor-compression air-conditioning systems for residential use is documented. Computer simulations for both solar and conventional heating and cooling systems were performed for 12-month heating and cooling seasons. Annual thermal performance and the resulting life cycle costs for both types of systems were analyzed and compared. The heating/cooling season simulations were run for five U.S. cities representing a wide range of climatic conditions and insolation. With the informaion resulting from these simulations, the optimum air-conditioning system was chosen to maximize the conservation of fossil fuels and minimize operating costs. Because of the increasing use of residential air conditioning employing electrically driven vapor-compression coolers, the five locations were studied to determine if it would be beneficial (in terms of both economics and fossil fuel displacement) to displace fossil-fuel-powered vapor-compression coolers and natural gas space heaters with solar-powered heating and desiccant cooling systems. (ERA citation 04:049743)

STU-76-4229 PC **A04**/MF **A01**
Styrelsen foer Teknisk Utveckling, Stockholm (Sweden).
Recycling of Dust from Steel Furnaces.
L. Lindskog. Mar 78, 56p
In Swedish.
U.S. Sales Only.

The dust from steel furnaces can be used for the production of gas. The possibilities of using the heat of this gas as process heat, for district heating, or for electricity production are considered. (ERA citation 04:048865)

STUDSVIK/EP-78/100 PC **A10**/MF **A01**
Studsvik Energiteknik AB, Nykoeping (Sweden).
Critical Analysis of Different Heating Methods.
L. Andersson, L. Ljung, and J. E. Nowacki. Mar 78, 202p STU-78-3265
In Swedish.
U.S. Sales Only.

The aim of the work has been o look for more efficient methods for heating houses. Great efforts are made to define terms which make it possible to describe and compare different systems. (ERA citation 04:048830)

13B. Civil Engineering

AD-A073 871/6 PC **A04**/MF **A01**
Arnold Engineering Development Center Arnold AFS TN
Contamination Measurements from a 5 lb sub F Thrust Bipropellant Engine - Phase II.
Final rept.,
R. E. Alt, H. M. Powell, L. L. Price, D. F. Frazine, and W. B. Stephenson. 22 Jan 79, 52p Rept no. AEDC-TSR-79-V4
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

A Bipropellant Rocket Engine plume contamination test program was conducted in the Aerospace Chamber (10V) between Sept. 25 and Oct. 20, 1978. During the four week test period a 5- lb sub F thrust rocket engine was fired over a range of engine operating parameters in a cryogenically pumped vacuum chamber where the background pressure was maintained below 1 x .0000001 torr. A vidicon image intensifier coupled spectrometer (VICS) system was used in conjunction with an electron beam to make number density and rotational temperature measurements of gas species (N2, CO, CO2, and H2/H20) in the forward flow region of the rocket nozzle. A photomultiplier tube was used in place of the vidicon to make number density and temperature measurements of N2 in the plume backflow region. Forward flow laser light scattering measurements were made with the VICS system to characterize the particle size and particle number distributions in the plume core. Mass flux measurements were made in the plume backflow region (60 degrees-135 degrees off axis) with cryogenically cooled quartz crystal microbalances (QCM's). (Author)

AD-A073 894/8 PC **A03**/MF **A01**
Construction Engineering Research Lab (Army) Champaign IL
Simplified Sanitary Landfill Design.
Final rept.,
G. L. Gerdes, and B. A. Donahue. Aug 79, 43p Rept no. CERL-TR-N-78

This report surveys and summarizes state-of-the-art practices in the design and operation of sanitary landfills. This information is intended to be used as guidelines for Facilities Engineers at Army installations. All aspects of sanitary landfills are covered, including site selection, design, pollution control, operation, and final closure.

AD-A073 906/0 PC **A03**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS
Nondestructive Testing of Concrete T-Walls, Atchafalaya Basin Protection Levees, New Orleans District.
Final rept.,
Henry T. Thornton, Jr. Aug 79, 27p Rept no. WES-MP-SL-79-18

Nondestructive testing measurements were made on two concrete inverted T-walls constructed in the east and west protection levees of the Atchafalaya Basin. These T-walls are to accommodate a 36-in. crude oil pipeline that will cross the basin. Ultrasonic velocity measurements were made through the upright portion of the walls where visible seams of apparent inadequate compaction and exposed reinforcing steel caused concern for the structural integrity of the walls. Measurements were also made to determine if there were any defects in critical areas such as near the intersections of the vertical wall and the base slab. In each wall there is a section of concrete which houses the casing collar where the pipeline passes through the walls. The wall surfaces in these areas were alleged to have been patched and smoothed with a neat cement grout to cover numerous surface irregularities. Velocities obtained in these particular areas of both walls confirm the presence of inferior quality material. The measurements made in other areas of the east wall produced only one velocity that is indicative of concrete of questionable quality. Four of the 32 velocities obtained from the other areas of the west wall indicated inferior quality concrete. Attempts to make determinations concerning the continuity of the foundation piles using the pulse-echo technique were not successful. (Author)

AD-A073 978/9 MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Lake Parsippany Dyke Number 1 (NJ-00358), Passaic River Basin, Eastmans Brooks, Morris County, New Jersey. Phase I Inspection Report.
Final rept.,
Richard J. McDermott, and John E. Gribbin. Jun 79, 90p
Contract DACW61-79-C-0011
Prepared in cooperation with Storch Engineering, Florham Park, NJ. Original contains color plates: All DDC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and

hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A073 979/7 MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Speedwell Dam (NJ-00359), Passaic River Basin, Whippany River-Morris County, New Jersey. Phase I Inspection Report.
Final rept.,
Richard J. McDermott, and John E. Gribbin. May 79, 98p
Contract DACW61-79-C-0011
Prepared in cooperation with Storch Engineering, Florham Park, NJ. Original contains color plates: All DDC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

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AD-A073 995/3 PC **A05**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Millhurst Lake Dam, NJ-00296. Raritan River Basin, Manalapan Brook, Monmouth County, New Jersey. Phase I Inspection Report.
Final rept.,
Anthony G. Posch. Aug 79, 95p
Contract DACW61-79-C-0011
Prepared in cooperation with Harris-ECI, Woodbridge, N.J. Original contains color plates: All DDC and NTIS reproductions will be in black and white.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A073 996/1 PC **A06**/MF **A01**
Trinity Univ San Antonio TX Lab of Cellular Physiology
Biodegradation of Phenolic Paint-Stripping Waste: Laboratory Evaluation of a Fixed Film Batch Reactor.
Final rept. Oct 77-Jan 79,
Howell D. Cobb, Jr., John W. Egan, William E. Olive, Jr., and Daniel J. Hansen. May 79, 119p
ESL-TR-79-11
Contract F08635-77-C-0156

USAF aircraft and ground support equipment require the protection of durable epoxy-polyurethane surface coatings. Maintenance of such painted surfaces using phenol - and chromium-containing strippers has created a waste disposal problem that is aggravated by the centralization of large aircraft depainting operations. The present investigation studied performance of a selectively-seeded, dedicated-function, trickling filter-type biodegradation unit. The specific waste target was the concentrated phenolic waste water produced at the Kelly AFB-ALC depaint facility. Three filter units utilizing a top-down fluid-air flow batch operation were built at Trinity University, San Antonio, TX. Experiments were run examining solid support media choice, bed length and volume, ventilation requirements, hydraulic surface loading, phenol concentration and loading, rate kinetics, chromium tolerance, starvation response, and temperature effects. It was theorized that the batch process with its alternating starvation/loading cycles selects for a microbial community better able to cope with occasional wider swings in this cycle. A thin-film reactor conserves the genes of its adapted community more efficiently than other reactor types. The data summarized in this report suggests that a batch fixed film process may have advantages over other biological unit processes for some phenolic waste-streams.

AD-A074 025/8 PC **A05**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Lake Topanemus Dam (NJ-00219), Raritan River Basin, McGellairds Brook, Monmouth County, New Jersey. Phase I Inspection Report.
Final rept.,
Anthony G. Posch. Aug 79, 90p
Contract DACW61-79-C-0011
Original contains color plates: All DDC and NTIS reproductions will be in black and white. Prepared in cooperation with Harris-ECI, Woodbridge, NJ.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A074 168/6 MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Rock Ridge Lake Dam (NJ 00178), Passaic River Basin, Rockaway River, Morris County, New Jersey. Phase 1 Inspection Report.
Final rept.,
Warren A. Guinan. Aug 79, 105p
Contract DACW61-79-C-0011
Availability: Microfiche copies only.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's gneral condition is included in the report. (Author)

AD-A074 170/2 PC **A05**/MF **A01**
Construction Engineering Research Lab (Army) Champaign IL
Development of a Pavement Condition Rating Procedure for Roads, Streets, and Parking Lots. Volume I. Conditions Rating Procedure.
Final rept.,
Mohamed Y. Shahin, and Starr D. Kohn. Jul 79, 92p Rept no. CERL-TR-M-268-VOL-1
See also Volume 2, AD-A074 171 and Rept. nos. AFCEC-TR-76-22 and CEEDO-TR-77-44.

Volume I describes the development and verification of a pavement condition index (PCI) for rating jointed concrete (plain and reinforced) and asphalt surfaced roads, streets, parking lots, and hardstands subjected to pneumatic tired and tracked vehicular traffic. A similar method for air fields has been developed and officially adopted by the U.S. Air Force. the PCI, which measures pavement structural integrity and surface operational condition, is calculated based on measured pavement distress types, severities, and densities obtained during pavement inspection. Volume II describes the distress types and severity levels, and the measurement criteria to use when collecting data for the PCI calculation. Field tests indicate that the PCI closely agrees with the collective judgment (mean rating) of experienced pavement engineers. The PCI was found to be much more consistent than ratings by individual engineers since it is based on measured distress data, and not on subjective judgment.

AD-A074 171/0 PC **A06**/MF **A01**
Construction Engineering Research Lab (Army) Champaign IL
Development of a Pavement Condition Rating Procedure for Roads, Streets, and Parking Lots. Volume II. Distress Identification Manual.
Final rept.,
Mohamed Y. Shahin, and Starr D. Kohn. Jul 79, 120p Rept no. CERL-TR-M-268-VOL-2
See also Volume 1, AD-A074 170 and Rept. nos. AFCEC-TR-76-22 and CEEDO-TR-77-44.

Volume I describes the development and verification of a pavement condition index (PCI) for rating jointed concrete (plain and reinforced) and asphalt surfaced roads, streets, parking lots, and hardstands subjected to pneumatic tired and tracked vehicular traffic. A similar method for air fields has been developed and officially adopted by the U.S. Air Force. The PCI, which measures pavement structural integrity and surface operational condition, is calculated based on measured pavement distress types, severities, and densities obtained during pavement inspection. Volume II describes types and severity levels, and the measurement criteria to use when collecting data for the PCI calculation. Field tests indicate that the PCI closely agrees with the collective judgment (mean rating) of experienced pavement engineers. The PCI was found to be much more consistent than ratings by individual engineers since it is based on measured distress data, and not on subjective judgment.

AD-A074 172/8 PC **A04**/MF **A01**
Army Medical Bioengineering Research and Development Lab Fort Detrick MD
Rotating Biological Contactor Process for Secondary Treatment and Nitrification Following a Trickling Filter.
Final rept. Aug 76-Nov 78,
Roy D. Miller, Charles I. Noss, Arnold Ostrofsky, and Robert S. Ryczak. Jun 79, 70p Rept no. USAMBRDL-TR-7905

Typical Army wastewater treatment plants can be upgraded to secondary stadards for BOD5 by incorporation of the rotating biological contactor (RBC) process downstream of existing trickling filters. Existing trickling filter plants can also be upgraded for ammonia removal by using the RBC process for nitrification. In these studies both BOD5 removal and nitrification rates were affected by wastewater temperature. However, nitrification rates were more sensiive to low w astewater temperature than secondary treatment. Results indicate that chemical feed for elevated pH levels of about pH8.0 in the RBC influent increases the rate of nitrification and decreases RBC surface area requirements. The decrease in required RBC surface area for secondary treatment or nitrification will result in less costly upgrades for existing trickling filter wastewater treatment facilities. Increased rates of nitrification will also result in more consistent and reliable attainment of effluent standards. The RBC in this study received effluent from a high-rate trickling filter that performed at less than secondary effluent standards. Performance of the RBC was evaluated over a 2-year period without temperature control, in order to determine both summer and winter efficienc eis for BOD5 reduction and ammonia-nitrogen removal.

AD-A074 196/7 PC **A04**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Crystal Lake Dam, NJ-00169. Passaic River Basin. Troy Brook, Morris County, New Jersey. Phase I Inspection Report.
Final rept.,
Warren H. Guinan. Aug 79, 72p
Contract DACW61-79-C-0011
Original contains color plates: All DDC and NTIS reproductions will be in black and white.

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AD-A074 199/1 PC **A07**/MF **A01**
Natural Resources Management Board Fort Benning GA
Conservation not Conversation.
15 Dec 67, 128p
Original contains color plates: All DDC and NTIS reproductions will be in black and white.

This report has been prepared under the direction of the Natural Resources Management Board as

the Fort Benning, Georgia, nomination for the Chief of Staff, United States Army Conservation Award, and the Secretary of Defense Conservation Award in accordance with the provisions of AR 420-74.

AD-A074 216/3 PC **A03**/MF **A01**
George Washington Univ Washington DC Program in Logistics
Optimal Treatment Levels of a Stream Pollution Abatement System Under Three Environmental Control Policies. Part II. Preliminary Sensitivity Analysis of a Convex Equivalent of the Fixed Dissolved Oxygen Requirement Policy GP Model Using Sensumt.
Scientific rept.,
Anthony V. Fiacco, and Abolfazl Ghaemi. 29 Jun 79, 45p Rept no. SERIAL-T-405
Contract N00014-75-C-0729
See also Part 1, AD-A068 313.

The sensitivity is analyzed of the optimal waste treatment cost of a water pollution control model, with respect to the parameters involved in the formulation of the model. This analysis is conducted for the policy mandating a fixed dissolved oxygen requirement, using an upper Hudson River data base. Details concerning the formulation and solution of this problem were reported in another paper. It is shown here that the maximum allowable dissolved oxygen deficit is unequivocally the parameter to which the optimal waste treatment cost is most sensitive. All of the many parameters involved in the model are analyzed and, relative to stipulated assumptions, are shown to have from significant to negligible impact on the waste treatment cost. (Author)

AD-A074 219/7 PC **A11**/MF **A01**
Adriaan Volker Dredging Co Rotterdam (Netherlands)
Assessment of Certain European Dredging Practices and Dredged Material Containment and Reclamation Methods.
Final rept.,
K. d'Angremond, J. Brakel, A. J. Hoekstra, W. C. H. Kleinbloesem, and L. Nederlof. Dec 78, 242p WES-TR-D-78-58
Contract DAJA37-75-C-0382
Report on Dredged Material Research Program.

A study was made of dredging practices, reclamation methods, and environmental effects of dredging in western Europe by visiting more than twenty ports in six countries and discussing pertinent matters with knowledgeable authorities at each port. A remarkable similarity of dredging practices, reclamation methods, and dredging equipment was noted among the European ports. The productive land use of dredged material was common goal. Contamination problems existed or were potential, to various degrees, at all ports, but few ports were able to assess in specific quantitative terms the status of the local contamination, much less to offer well-developed techniques for the solution of their problems. All were aware of the need for continued research into dredging practices and reclamation methods and of the need to intensify research in the area of environmental effects, particularly contamination. The need for regional and world-wide legislation to control contamination and other adverse environmental effects also was universally recognized. Technical details of describing, increasing the density of, disposing, and making productive use of dredged material were discussed, often by using the widely accepted techniques employed in the Rotterdam Harbor as examples. Conventional and special dredging equipment is described and contamination of dredged material and environmental effects is discussed in detail in this report. (Author)

AD-A074 230/4 PC **A04**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Kittatinny Lake Dam (NJ-00265), Delaware River Basin, Flat Brook, Sussex County, New Jersey. Phase I Inspection Report.
Final rept.,
F. Keith Jolls. Jun 79, 57p
Contract DACW61-79-C-0011
Original contains color plates: All DDC and NTIS reproductions will be in black and white. Prepared in cooperation with Berger (Louis) and Associates, East Orange, NJ.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A074 232/0 PC **A07**/MF **A01**
Army Engineer Waterways Experiment Station Vicksburg MS
Plan for Development of Systematic Procedures to Aid Corps Districts in Flood Damage Calculations.
Final rept. Apr-Dec 77,
Victor E. LaGarde. Jun 79, 141p Rept no. WES-TR-EL-79-3

The study of alternative structural and nonstructural approaches to reducing flood damages is a major Corps activity. A plan was prepared, with Corps Districts and Divisions input, for upgrading and enhancing existing Corps flood damage estimation capabilities with no departure from accepted Corps concepts or general methodologies. The plan takes advantage of many available technical tools and is directed to the streamlining and standardizing of acquistion, processing, and storage of data; the calculation of residential, commercial, industrial, agricultural, land-use type damages; and the aggregation of calculation results on single flood, flood zones, and average annual bases. (Author)

AD-A074 247/8 Not available NTIS
California Inst of Tech Pasadena W M Keck Lab of Hydraulics and Water Resources
Pulsing Flow in Steep Alluvial Streams,
Michael G. Foley, and Vito A. Vanoni. 3 Jan 77, 9p,p ARO-11908.6.GS
Grant DAHC04-74-G-0189
Sponsored in part by Grant NSF-GK-31802. Prepared in cooperation with Missouri Univ.-Columbia. Availability: Pub. in Jnl. of the Hydraulics, Div., Proceedings of the American Society of Civil Engineers, v103 nHY8 p843-850 Aug 77, Paper 13114 (No copies furnished by DDC).

No abstract available.

AD-A074 267/6 PC **A04**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Haddon Lake Dam (NJ 00395), Delaware River Basin, South Branch Newton Creek, Camden County, New Jersey. Phase 1 Inspection report.
Final rept.,
F. Keith Jolls. Jun 79, 59p
Contract DACW61-79-C-0011
Original contains color plates: All DDC and NTIS reproductions will be in black and white.

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AD-A074 268/4 PC **A04**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Clearview Lake Dam (NJ 00147), Passaic River Basin, Paulins Kill Tributary, Sussex County, New Jersey. Phase 1 Inspection Report.
Final rept.,
F. Keith Jolls. Aug 79, 58p
Contract DACW61-79-C-0011
Original contains color plates: All DDC and NTIS reproductions will be in black and white.

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AD-A074 270/0 PC **A05**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Mt. Kemble Lake Dam. (NJ-00363). Passaic River Basin, Primrose Brook-Morris County, New Jersey. Phase I Inspection Report.
Final rept.,
Richard J. McDermott, and John E. Gribbin. Jul 79, 87p
Contract DACW61-79-C-0011
Original contains color plates: All DDC and NTIS reproductions will be in black and white.

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AD-A074 271/8 PC **A05**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Lake Parsippany Dam (NJ-00355). Passaic River Basin. Eastmans Brook, Morris County, New Jersey. Phase 1 Inspection Report.
Final rept.,
Richard J. McDermott, and John E. Gribbin. May 79, 96p
Contract DACW61-79-C-0011
Original contains color plates: All DDC and NTIS reproductions will be in black and white.

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AD-A074 272/6 PC **A05**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Hoopes Dam (DE-00015) Delaware River Basin, Old Mill Stream. New Castle County, Delaware. Phase 1 Inspection Report.
Final rept.,
John J. Williams. Jul 79, 84p
Contract DACW61-79-C-0011
Original contains color plates: All DDC and NTIS reproductions will be in black and white.

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AD-A074 322/9 MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Deer Pond Dam (NJ 00157), Passaic River Basin, Stony Brook, Morris County, New Jersey. Phase 1 Inspection Report.
Final rept.,
Warren A. Guinan. Aug 79, 104p
Contract DACW61-79-C-0011
Prepared in cooperation with Anderson-Nichols and Co., Concord, NH. Original contains color

plates: All DDC and NTIS reproductions will be in black and white. Includes envelope with maps.
Availability: Microfiche copies only.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A074 323/7 MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Amphibious Lake Dam (NJ 00457), Delaware River Basin, Newbold Run, Burlington County, New Jersey. Phase I Inspection Report.
Final rept.,
John J. Williams. Jun 79, 105p
Contract DACW61-79-C-0011
Prepared in cooperation with O'Brien and Gere Engineers, Inc., Philadelphia, PA. Original contains color plates: All DDC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

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AD-A074 324/5 MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Sylvan Lake Dam (NJ-00151), Delaware River Basin, Mill Stream, Burlington County, New Jersey. Phase I Inspection Report.
Final rept.,
John J. Williams. May 79, 117p
Contract DACW61-79-C-0011
Original contains color plates: All DDC and NTIS reproductions will be done in black and white. Prepared in cooperation with O'Brien and Gere Engineers, Inc., Philadelphia, PA. Justin and Courtney Div.
Availability: Microfiche copies only.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A074 325/2 MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Willow Crest Dam (NJ-00272), Delaware River Basin, Black Brook, Sussex County, New Jersey. Phase I Inspection Report.
Final rept.,
F. Keith Jolls. Aug 79, 61p
Contract DACW61-79-C-0011
Original contains color plates: All DDC and NTIS reproductions will be in black and white. Prepared in cooperation with Berger (Louis) and Associates, East Orange, NJ.
Availability: Microfiche copies only.

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AD-A074 338/5 PC **A05**/MF **A01**
National Aviation Facilities Experimental Center Atlantic City NJ
Exhaust Emissions Characteristics for a General Aviation Light-Aircraft Teledyne Continental Motors 6-285-B (TIARA) Piston Engine.
Final rept.,
Eric E. Becker. Aug 79, 99p FAA-NA-79-30, FAA-RD-79-67

The Teledyne Continental Motors 6-285-B engine (S/N700106) was tested at the National Aviation Facilities Experimental Center (NAFEC) to develop an exhaust emissions data base. This data base consists of current production baseline emissions characteristics, lean-out emissions data, effects of leaning-out the fuel schedule on cylinder head temperature, and data showing ambient effects on exhaust emissions and cylinder head temperatures. The engine operating with its current full-rich production fuel schedule could not meet the proposed Environmental Protection Agency (EPA) standard for carbon monoxide (CO) under sea level standard-day conditions. The engine did, however, meet the proposed EPA standards for unburned hydrocarbons (HC) and oxides of nitrogen (NOx) under sea level standard-day conditions. The results of engine testing under different ambient conditions are also presented, and these results show a trend toward higher levels of emissions output for CO and HC under warm-or hot-day conditions while producing slightly lower levels of NOx. (Author)

AD-A074 353/4 PC **A05**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Mt. Hope Lake Dam (NJ-00464) Passaic River Basin, White Meadow Brook, Morris County, New Jersey. Phase 1 Inspection Report.
Final rept.,
Richard J. McDermott, and John E. Gribbin. Jun 79, 96p
Contract DACW61-79-C-0011
Prepared in cooperation with Storch engineering, Florham Park, NJ. Original contains color plates: All DDC and NTIS reproductions will be in black and white.

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AD-A074 354/2 PC **A04**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Perona Lake Dam Number 1 (NJ-00295) Delaware River Basin, Pequest River, Tributary, Sussex County, New Jersey. Phase 1 Inspection Report.
Final rept.,
F. Keith Jolls. Jun 79, 53p
Contract DACW61-79-C-0011
Prepared in cooperation with Lous Berger and Associates, East Orange, NJ. Original contains color plates: All DDC and NTIS reproductions will be in black and white.

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AD-A074 355/9 PC **A04**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Perona Lake Dam Number 2 (NJ-00294) Delaware River Basin, Pequest River, Tributary Sussex County, New Jersey. Phase 1 Inspection Report.
Final rept.,
F. Keith Jolls. Jun 79, 52p
Contract DACW61-79-C-0011
Prepared in cooperation with Louis Berger and Associates, East Orange, NJ. Original contains color plates: All DDC and NTIS reproductions will be in black and white.

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AD-A074 356/7 PC **A04**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Lake Wallkill Dam (NJ-00032), Hudson River Basin, Wallkill River, Tributary, Sussex County, New Jersey. Phase I Inspection Report.
Final rept.,
F. Keith Jolls. Jul 79, 61p
Contract DACW61-79-C-0011
Prepared in cooperation with Louis Berger and Associates, East Orange, NJ. Original contains color plates: All DDC and NTIS reproductions will be in black and white.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A074 357/5 PC **A05**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Patex Pond Dam (NJ 00177), Passaic River Basin, Crooked Brook, Morris County, New Jersey. Phase I Inspection Report.
Final rept.,
Warren A. Guinan. Aug 79, 82p
Contract DACW61-79-C-0011
Prepared in cooperation with Anderson-Nichols and Co., Concord, NH. Original contains color plates: All DDC and NTIS reproductions will be in black and white.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A074 358/3 PC **A05**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Birchwood Lake Dam (NJ 00168), Passaic River Basin, Troy Brook, Morris County, New Jersey. Phase I Inspection Report.
Final rept.,
Warren A. Guinan. Aug 79, 81p
Contract DACW61-79-C-0011
Prepared in cooperation with Anderson-Nichols and Co., Concord, NH.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A074 359/1 PC **A04**/MF **A01**
New Jersey Dept of Environmental Protection Trenton

National Dam Safety Program. Stony Brook Dam Number 4 (NJ 00390), Raritan River Basin, Stony Brook Tributary, Mercer County, New Jersey. Phase 1 Inspection Report.
Final rept.,
Keith F. Jolls. Jun 79, 59p
Contract DACW61-79-C-0011
Prepared in cooperation with Berger (Louis) and Associates, Inc., East Orange, NJ.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A074 360/9 PC **A04**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. New Jersey No Name Dam Number 14 (NJ 00379), Hudson River Basin, West Branch of Papakating Creek, Sussex County, New Jersey. Phase 1 Inspection Report.
Final rept.,
Keith F. Jolls. Jul 79, 59p
Contract DACW61-79-C-0011
Prepared in cooperation with Berger (Louis) and Associates, Inc., East Orange, NJ.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A074 361/7 PC **A05**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Lake Estling Dam (NJ 00184), Passaic River Basin, Den Brook, Morris County, New Jersey, Phase 1 Inspection Report.
Final rept.,
Warren A. Guinan. Aug 79, 81p
Contract DACW61-79-C-0011
Prepared in cooperation with Anderson-Nicols and Co., Concord, NH.

This report cites results of a technical investigation as tothe dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A074 362/5 PC **A05**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Dixons Pond Dam NJ (00175), Passaic River Basin, Stony Brook Tributary, Morris County, New Jersey. Phase 1 Inspection Report.
Final rept.,
Warren A. Guinan. Jun 79, 85p
Contract DACW61-79-C-0011
Prepared in cooperation with Anderson-Nichols and Co., Concord, NH.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A074 363/3 PC **A04**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program, Canistear Reservoir Dam Number 1 (NJ-00485), Passaic River Basin, Pacack Brook, Sussex County, New Jersey. Phase I Inspection Report.
Final rept.,
F. Keith Jolls. Jun 79, 62p
Contract DACW61-79-C-0011
Original contains color plates: All DDC and NTIS reproductions will be in black and white. Prepared in cooperation with Berger (Louis) and Associates, East Orange, NJ.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A074 364/1 PC **A05**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Boonton Reservoir Dam (NJ-00255), Passaic River Basin, Stony Brook Tributary, Morris County, New Jersey. Phase 1 Inspection Report.
Final rept.,
Warren A. Guinan. Jul 79, 76p
Contract DACW61-79-C-0011
Original contains color plates: All DDC and NTIS reproductions will be in black and white. Prepared in cooperation with Anderson Nichols and Co., Concord, NJ.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

AD-A074 365/8 PC **A04**/MF **A01**
New Jersey Dept of Environmental Protection Trenton
National Dam Safety Program. Canistear Reservoir Dam Number 2 (NJ-00561), Passaic River Basin, Pacack Brook, Sussex County, New Jersey. Phase 1 Inspection Report.
Final rept.,
F. Keith Jolls. Jun 79, 75p
Contract DACW61-79-C-0011
Original contains color plates: All DDC and NTIS reproductions will be in black and white. Prepared in cooperation with Berger (Louis) and Associates, East Orange, NJ.

This report cites results of a technical investigation as to the dam's adequacy. The inspection and evaluation of the dam is as prescribed by the National Dam Inspection Act, Public Law 92-367. The technical investigation includes visual inspection, review of available design and construction records, and preliminary structural and hydraulic and hydrologic calculations, as applicable. An assessment of the dam's general condition is included in the report. (Author)

CONF-790405-19 PC **A02**/MF **A01**
Argonne National Lab., IL.
National Air Quality Policies and Developing Energy Technologies.
D. B. Garvey, and D. G. Streets. 1979, 24p
Contract W-31-109-ENG-38
AICE meeting, Houston, TX, USA, 1 Apr 1979.

The Clean Air Act Amendments of 1977 and subsequent EPA regulations are discussed. Three aspects of air quality management are emphasized: prevention of significant deterioration, nonattainment, and new source performance standards. The current status of EPA regulations to implement those sections of the law is examined. (ERA citation 04:050576)

CONF-790739-1 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Regional Environmental Studies: Application of the Geoecology Data Base.
R. J. Olson, J. M. Klopatek, and C. J. Emerson. 1979, 26p
Contract W-7405-ENG-26
Harvard computer graphics week '79, Cambridge, MA, USA, 15 Jul 1979.

Regional studies examine the spatial, temporal, and functional characteristics of geographic areas whose size and boundary configuration often depend on the definition of a particular problem. Thus, reference may be made to ecological, urban, economic, political or abstract regions. To address environmental problems at the regional scale, the county-level Geoecology Data Base was developed. Using selected variables from existing data sources, a standardized digital data base was created for the conterminous United States. Over 1000 variables on file for county-subcounty units provide data on terrain, water resources, forestry, vegetation, wildlife, agriculture, land use, climate, air quality, population, and energy. The data base is described, and the utility of the county-level data base is illustrated with three examples. The Geoecology Data Base is utilized in conjunction with statistical analysis (SAS) and cartographic display (SYMAP, EZMAP, etc.) programs to both characterize regional environmental systems and to delineate possible environmental impacts. Much of the effort involved in creation and expansion of the Geoecology Data Base consists of obtaining and editing diverse inventory and monitoring files. An integral aspect of this activity is the promotion of data exchange through increased awareness of available data and development of more efficient exchange methods. The three examples involve regional environmental studies. First, future patterns of projected levels of SO sub 2 are overlaid on SO sub 2 -sensitive agricultural crops and forest resources. Secondly, those areas of potential natural vegetation of the United States as modified or replaced by current land use are depicted.Finally, an ecological evaluation of potential wilderness areas using a number of county-subcounty ecological parameters is discussed. (ERA citation 04:050575)

COO-4563-01(Rev.) PC **A03**/MF **A01**
Pittsburgh Univ., PA. Dept. of Industrial Environmental Health Sciences.
Environmental Noise Assessment for Synthane Pilot Plant.
T. Yen. 29p
Contract EY-77-S-02-4563

Environmental noise data were obtained at eleven selected sites around the SYNTHANE Pilot Plant at Bruceton, Pennsylvania. The data revealed that noise emission from the plant has a significant impact upon an area as far as about a mile to the east of the plant. It is recommended that additional data be obtained when the plant is operating at its design capacity. (ERA citation 04:049449)

DOE/ERD-0023 PC **A03**/MF **A01**
Department of Energy, Washington, DC.
Environmental Readiness Document: Coal/Oil Mixtures.
Jun 79, 29p

The risks to successful commercialization of COM from environmental concerns fall into two categories: first, that significant environmental or health impacts that had not been anticipated will be identified and, second, that the magnitude of actual impacts will be considerably larger than anticipated and wil not be readily mitigated or acceptably controlled using existing environmental control technology. As COM technology is quite similar to conventional combustion in terms of environmental effects, these risks appear low. The status of environmental laws and regulations that may affect the use of COM is outlined. The concerns identified include both known environmental concerns and areas where a strong potential exists for the identification of environmental concerns. The status of regulations and standards under the major environmental laws, which pollutants are of concern, and possible future revisions to the standards are discussed. The major areas of environmental concern associated with the use of COM are the ability to control particulate and sulfur oxide emissions, the possibility of adverse toxic pollutant emissions due to the use of additives, emissions of soot due

to boiler derating, the disposal of solid and liquid wastes, and health impacts in urban areas. Each concern is discussed in detail. The environmental risks of proceeding with commercialization of COM relative to these concerns are outlined. COM will be retrofit to existing utility and industrial boilers. EPA has ruled that facilities that switch from oil to COM would remain classified as existing facilities and would therefore not be bound by New Source Performance Standards. (ERA citation 04:048094)

DOE/ET/2099-T1(V.1) PC **A10**/MF **A01**
Gilbert/Commonwealth, Reading, PA.
Factors Affecting the Potential of Direct Load Control for Non-Generating Utilities. Final Report.
Apr 79, 207p
Contract EX-76-C-01-2099

Several alternatives are available for achieving load management, including direct or voluntary control of customer loads, customer or utility energy storage systems for diurnal load shifting, and expanded interconnection and operation of electric power systems. All of these alternatives are available to the fully integrated (generating, transmitting and distributing) electric utility and the analysis of their effects encompasses the power supply and delivery system. However, the costs and benefits of the alternatives to the fully integrated electric utility are perhaps not so obvious. Therefore, by considering a non-generating utility, this analysis focuses upon the distribution system and wholesale power supply interaction as a step toward an analysis including the power supply and delivery system. This report develops an analysis procedure and discusses some of the relevant factors to be consdered in the application of direct load control for a non-generating utility system. The analysis concentrates on the distribution system only to determine the effect of rates and payback as a result of direct load control. Thus, the study is responsive to the specific needs of the non-generating utility. This analysis of direct load control encompasses the determination of those loads amenable to control, the selection of a suitable one-way communications system to rend control and the estimation of expected benefits and costs. The complementary functions to the application of direct load control such as automatic meter reading via the addition of a bi-directional communications system and voltage control are not included in the analysis but are detailed for future consideration. (ERA citation 04:050239)

EPRI-EA-1080 PC **A12**/MF **A01**
Asplundh Environmental Services, Willow Grove, PA.
Right-of-Way Ecological Effects Bibliography.
M. T. Galvin, and R. D. Cupit. May 79, 258p

This report consists of an annotated bibliography containing 824 citations of documents covering the published state-of-the-art through 1977 in describing ecological effects of overhead transmission line rights-of-way. The citations are indexed according to author, subject, and ecological region. (ERA citation 04:048541)

FE-2496-40 PC **A03**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA.
Status Report: Engineering Contributions to Coal Gasification Environmental Analysis. Ninth Quarterly Report.
M. J. Massey, and J. P. Fillo. Oct 78, 26p
Contract EX-76-S-01-2496

This report represents the third annual report of progress in the coordination of DOE Fossil Energy's environmental characterization activities at its coal gasification pilot plants. Participants in the program include Argonne National Laboratory (Hygas), Combustion Engineering (CE gasifier), the Grand Forks Energy Technical Center (slagging fixed bed gasifier), the Institute of Gas Technology (Hygas), Oak Ridge National Laboratory (gasifiers in industry), the Pittsburgh Energy Technical Center (Synthane), Phillips Petroleum (Bi-Gas), and Radian Corp. (C sub 2 -Acceptor). Coordination and evaluation efforts are carried out by Carnegie-Mellon University with the assistance of its sub-contractor, Environmental Research and Technology, Inc. Substantial progress has been made by each of the listed participants during the past year; their work is extensively documented in a series of reports now available in the literature. The present report is devoted to a discussion of the evolving role of engineering in the generation of coal gasification environmental data bases. Significant engineering contributions to the program are highlighted here with supporting data. (ERA citation 04:048048)

NUREG/CR-0798 PC **A07**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Evaluation of Empirical Atmospheric Diffusion Data.
Final technical rept. 1976-79,
T. W. Horst, J. C. Doran, and P. W. Nickola. Oct 79, 150p PNL-2599
Contract DOE-EY-76-C-06-1830

A study has been made of atmospheric diffusion over level, homogeneous terrain of contaminants released from non-buoyant point sources up to 100 m in height. Current theories of diffusion are compared to empirical diffusion data, and specific dispersion estimation techniques are recommended which can be implemented with the on-site meteorological instrumentation required by the Nuclear Regulatory Commission. A comparison of both the recommended diffusion model and the NRC diffusion model with the empirical data demonstrates that the predictions of the recommended model have both smaller scatter and less bias, particularly for ground-level sources.

NUREG/CR-0974 PC **A04**/MF **A01**
Washington Univ., Seattle. Center for Quantitative Science.
Simulating the Effects of Increased Temperature in a Plankton Ecosystem.
Technical rept.,
Gordon L. Swartzman, and Virginia Dale Adams. Oct 79, 56p
Contract NRC-04-75-222

The effects of increased temperature on phytoplankton and zooplankton seasonal dynamics were examined using a simulation model. A literature review indicated possible changes to be explored with the model. A simulation 'library' of hypotheses from various models was used to examine state variables and process effects on a daily basis, and this output was compared to data collected in Lake Ontario. Comparisons of plankton dynamics in thermally unloaded and loaded runs of the model showed differences in the two situations. Under thermal loading the spring phytoplankton peak occurs earlier and is limited by grazing whereas phosphorous limits the bloom in the unloaded environment. Also, more phytoplankton blooms occur in the model with increased temperature, and light becomes more limiting during the late summer. These comparisons led to hypotheses about adaptations favorable to phytoplankton in a thermally loaded environment.

NUREG-0601 PC **A04**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Site Safety and Environmental Analysis.
Impingement Dynamics and Age and Growth of Selected Species at Lake Dardanelle, a Southcentral Reservoir.
Technical rept. 1974-79,
Bruce E. Logan, and Michael T. Masnik. Oct 79, 65p

Impingement data collected between 1974 and 1979 was analyzed and compared with four years of data from Arkansas Nuclear One located on Lake Dardanelle, a southcentral run-of-the-river reservoir. Dorosoma petenense, D. cepedianum, Ictalurus punctatus, Lepomis macrochirus, and several other recreationally or ecologically important species commonly found on the intake screen were chosen for comparison. Weekly natural log transformed impingement estimates were plotted, and yearly impingement estimates were determined over the five year period. An analysis of variance on the transformed weekly estimates of eight species of fish indicated the significance of temperature on impingement for seven species. Results of the impingement analysis were compared and contrasted with age and growth studies in the reservoir.

N79-31207/0 PC **A10**/MF **A01**
General Electric Co., Cincinnati, OH.
Experimental Clean Combustor Program (ECCP), Phase 3.
Final Report.
C. C. Gleason, and D. W. Bahr. 1 Jun 79, 201p
NASA-CR-135384, R79AEG410
Contract NAS3-19736

A double annular advanced technology combustor with low pollutant emission levels was evaluated in a series of CF6-50 engine tests. Engine lightoff was readily obtained and no difficulties were encountered with combustor staging. Engine acceleration and deceleration were smooth, responsive and essentially the same as those obtainable with the CF6-50 combustor. The emission reductions obtained in carbon monoxide, hydrocarbons, and nitrogen oxide levels were 55, 95, and 30 percent, respectively, at an idle power setting of 3.3 percent of takeoff power on an EPA parameter basis. Acceptable smoke levels were also obtained. The exit temperature distribution of the combustor was found to be its major performance deficiency. In all other important combustion system performance aspects, the combustor was found to be generally satisfactory.

N79-31839/0 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Remote Monitoring of the Gravelly Run Thermal Plume at Hopewell and the Thermal Plume at the Surry Nuclear Power Plant on the James River.
T. A. Talay, K. W. Sykes, and C. Y. Kuo. Jul 79, 21p NASA-TM-80124
Conf-Presented at the Virginia Academy of Science, 56th Ann. Meeting, Blacksburg, 9-12 May 1978.

On May 17, 1977, a remote sensing experiment was conducted on the James River, Virginia, whereby thermal spectrometer and near-infrared photography data of thermal discharges at Hopewell and the Surry nuclear power plant were obtained by an aircraft for one tidal cycle. These data were used in subsequent investigations into the near field discharge trajectories. For the Gravelly Run thermal plume at Hopewell, several empirical expressions for the plume centerline were evaluated by comparisons of the computed trajectories and those observed in the remote sensing images.

N79-31840/8 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Air Pollution from Aircraft.
Final Report, Feb. 1969 - Oct. 1978.
J. B. Heywood, J. A. Fay, and N. A. Chigier. 26 Jun 79, 43p NASA-CR-162284
Contract NGR-22-009-378

Forty-one annotated abstracts of reports generated at MIT and the University of Sheffield are presented along with summaries of the technical projects undertaken. Work completed includes: (1) an analysis of the soot formation and oxidation rates in gas turbine combustors, (2) modelling the nitric oxide formation process in gas turbine combustors, (3) a study of the mechanisms causing high carbon monoxide emissions from gas turbines at low power, (4) an analysis of the dispersion of pollutants from aircraft both around large airports and from the wakes of subsonic and supersonic aircraft, (5) a study of the combustion and flow characteristics of the swirl can modular combustor and the development and verification of NO sub x and CO emissions models, (6) an analysis of the influence of fuel atomizer characteristics on the fuel-air mixing process in liquid fuel spray flames, and (7) the development of models which predict the stability limits of fully and partially premixed fuel-air mixtures.

N79-31890/3 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Spectral Measurements of Ocean-Dumped Wastes Tested in the Marine Upwelled Spectral Signature Laboratory.
W. G. Witte, J. W. Usry, C. H. Whitlock, and E. A. Gurganus. Sep 79, 34p NASA-TP-1480, L-12906

Transmission and inherent upwelled radiance measurements were made of various mixtures of three ocean-dumped industrial plant wastes in artificial seawater. Laboratory analyses were made of

the physical and chemical properties of the various mixtures. These results and the laboratory measurements of beam attenuation and inherent upwelled radiance indicate a variety of chemical and spectral responses when industrial wastes are added to artificial seawater. In particular, increased levels of turbidity did not always cause increased levels of inherent reflectance.

PATENT-4 150 055 Not available NTIS
Department of the Army Washington DC
Reduction and Desulfonation of 2,4- and 2,6-Dinitrobenzenesulfonates, which May Contain a Methyl Group in the 5-Position, to Primary Amino Compounds.
Patent,
Everett E. Gilbert. Filed 7 Sep 78, patented 17 Apr 79, 3p AD-D006 358/6, PAT-APPL-940 248 Supersedes PAT-APPL-940 248-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

2,4- and 2,6- Dinitrobenzenesulfonates, which may contain a methyl group in the 5 position, are reduced with sulfur dioxide in aqueous sulfuric acid medium at elevated temperatures, whereby one or both nitro groups are reduced to a primary amino group and the sulfonic acid group is eliminated. (Author)

PB80-100100 PC **A03**/MF **A01**
Agency for International Development, Washington, DC.
Developpement Communautaire: Definitions et Principes (Community Development: An Introduction to CD for Village Workers),
Jean Ogden. Apr 62, 47p
Text in French. See also English version, PB-289 991, and Spanish version, PB-297 632.

Social and economic community development through education, new product development, and use of local resources is discussed in this translation of an English publication titled 'Community Development'. The importance of raising the standard of living and improving sanitary conditions, thereby influencing the development of the nation, are stressed. Two methods for implementing these changes are outlined: (1) The direct method, where the aid of a specialist is enlisted, a study is done, solutions are suggested. (?) The indirect method, where the agent works with the local population to define problems and to present solutions. Both methods are analyzed as to desirability. Necessary characteristics for agents for community development as well as for leaders in the community are outlined. Ways of judging the success or failure rate of the effort and of long term results are included. Four references are listed.

PB80-100381 PC **A13**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Design and Construction of Covers for Solid Waste Landfills.
Rept. for Mar 77-Dec 78,
R. J. Lutton, G. L. Regan, and L. W. Jones. Aug 79, 276p EPA/600/2-79/165

The report provides guidelines in selection, design, and construction of cover for management of municipal, industrial, and hazardous solid wastes (with the exception of radioactive waste). Natural soils as cover are the principal subject; however, synthetic membranes, chemicals, and waste products are also discussed in detail since their relative importance should grow in the future. Each of the important functions of cover is considered in the context of selecting and designing cover but with cognizance of the effects of conflicts that may arise, e.g., between water infiltration and gas venting. A scheme is proposed for establishing functional priorities and in turn for weighting the importance of soil characteristics to allow for most effective selection. Allowance is made for functional conflicts through design features. Procedures are presented for designing soil cover systems to meet the requirements based on principles of soil mechanics and the state of the art in soil construction. Accordingly, this report is not so much a review of current methods as it is a guide to potentially the best practice.

PB80-100415 PC **A16**/MF **A01**
Corvallis Environmental Research Lab., OR.
Limnological and Socioeconomic Evaluation of Lake Restoration Projects: Approaches and Preliminary Results,
Spencer A. Peterson. Jan 79, 352p EPA/600/3-79/005

Nineteen papers were presented at the workshop held 28 February - 2 March, 1978 on the campus of Oregon State University. The objective was to assemble grantees and project officers associated with EPA's Lake Restoration Evaluation Program so that they could become familiar with each other's work. Outside experts were invited to offer constructive criticism of the current approach to assessment of techniques. Several lakes were considered for limnological, social and economic aspects. A draft copy of the Lake Evaluation Index (LEI) developed by EPA was presented and discussed.

PB80-100431 PC **A08**/MF **A01**
Michigan State Univ., East Lansing. Inst. of Water Research.
Utilization of Natural Ecosystems for Wastewater Renovation,
Thomas M. Burton, Darrell L. King, Robert C. Ball, and Thomas G. Bahr. Apr 79, 169p EPA/905/3-79/003
Grant EPA-Y005085

Michigan State University constructed on 200 ha (500 acres) of the main campus, a permanent facility for the experimental treatment, recycle and reuse of municipal sewage plant effluents. The facility provides for the diversion of up to 7570 cu m/day (2 MGD) of secondary effluent from an activated sludge treatment plant. This waste flow is directed away from the receiving stream to an intensely managed aquatic and terrestrial nutrient recycling system. The facility consists of a portion of the East Lansing Wastewater Treatment Plant, a transmission line, four experimental lakes and a spray irrigation site. A primary objective is to strip nutrients from the waste flow as it proceeds through the system by incorporating nutrients into harvestable biomass. The system has been in operation with tertiary effluent for about 18 months. It will go on line with secondary effluent in 1976. Biological activity in the aquatic system has a major impact on water quality as evidenced by significantly reduced water concentrations of phosphorus, nitrogen and inorganic carbon.

PB80-100456 PC **A06**/MF **A01**
Celanese Chemical Co., Inc., Corpus Christi, TX. Technical Center.
Biological Treatment of High Strength Petrochemical Wastewater.
Final rept. 20 Feb 76-23 Sep 79,
William J. Humphrey, and Enrique R. Witt. Aug 79, 113p EPA/600/2-79/172
Grant EPA-12020-EPH

The biological treatment of a complex petrochemical wastewater containing high concentrations of organic chlorides, nitrates, and amines was initially studied using a sequence of anaerobic methanogenesis and oxygen activated sludge. Bench-scale and pilot-plant treatability studies were conducted using various composite samples and process wastewater blends. The results of preliminary studies indicated the need for stream segregation and waste reduction programs at the petrochemical plant. Segregation of components of the combined plant waste stream was required to eliminate nonbiodegradable materials and pretreatment minimized the concentration of substances which were toxic or inhibitory to biological treatment. Nitrates inhibited methanogenesis in the anaerobic system but quantitative removal of nitrates was accomplished. Only partial removal of chemical oxygen demand (COD) was achieved during anaerobic denitrification because of the relatively low nitrate/COD ratio. Anerobic methanogenic treatment also was unsuccessful in reducing the COD concentration to any great extent, even after pretreatment by anaerobic denitrification. The activated sludge system was effective in removing the biodegradable portion expressed as biochemical oxygen demand (BOD) of the pretreated combined wastewater stream; but the yellow color of the effluent was unacceptably dark. The activated sludge system performed equally well when high purity oxygen, or air was used for aeration.

PB80-100498 PC **A10**/MF **A01**
Missouri Univ.-Rolla.
Radius of Pressure Influence of Injection Wells.
Final rept. Mar 77-Jan 79,
Don L. Warner, Leonard F. Koederitz, Andrew D. Simon, and M. Gene Yow. Aug 79, 216p EPA/600/2-79/170
Grant EPA-R-805039

It is often necessary, in injection well design, to predict the probable rate of pressure increase in the injection reservoir that would be expected to result from a proposed injection program. Areas of application include oilfield brine injection, waterflooding for secondary oil recovery, industrial wastewater injection, uranium leaching, etc. This report presents a number of available analytical solutions that can be used for pressure buildup calculation and three methods of performing such calculations. The methods are, manual calculation, calculation by programmable desk calculator, and calculation by digital computer.

PB80-100522 PC **A14**/MF **A01**
Robert S. Kerr Environmental Research Lab., Ada, OK.
Activated Carbon Treatment of Industrial Wastewaters: Selected Technical Papers.
Aug 79, 307p EPA/600/2-79/177

Because of the tremendous interest in the organic constituent removal by activated carbon, the two industrial categories displaying the most interest are the petroleum refining and petrochemical industries. EPA's Office of Research and Development has co-sponsored two technical symposia for the petroleum refining/petrochemical industries, and activated carbon treatment as an important section of both agendas. The technical papers presented research activities conducted by consultants, industries, and EPA. The presentations made at these symposia have been arranged into the following sequence: (1) State-of-the-Art, (2) Organic Compound Removal, (3) Granular Pilot-Scale Studies, (4) Powdered Activated Carbon Pilot-Scale Studies, (5) Full-Scale Granular Activated Carbon Treatment (6) Full-Scale Powdered Activated Carbon Treatment, and (7) Activated Carbon Regeneration. Economics of Activated Carbon Treatment are presented in the applicable individual technical papers and is not a separate topic for this report.

PB80-100571 PC **A05**/MF **A01**
Texas Dept. of Water Resources, Austin.
Ground-Water Availability in Texas, Estimates and Projections Through 2030,
Daniel A. Muller, and Robert D. Price. Sep 79, 82p TDWR/R-238
Color illustrations reproduced in black and white.

The purpose of this report is to present information on the quantity of ground water available in the State of Texas on an average annual basis through the year 2030. Specifically, the study provides estimates of the amounts of effective recharge and the amounts of water that can be recovered from storage for selected aquifers in the State. This appraisal re-evaluates and updates the ground-water availability data of the major and minor aquifers as presented in the 1968 Texas Water Plan, and considers additional aquifers where pertinent information has been obtained.

PB80-100597 PC **A06**/MF **A01**
Wisconsin Univ.-Madison. Inst. for Environmental Studies.
Environmental Characterization, Management and Planning, Six-Month Progress Report (3rd).
Progress rept. 1 May 71-30 Apr 74,
Reid A. Bryson. Jan 73, 103p NSF/RA/E-73/604
Grant NSF-GI-29731
See also 2nd Progress rept. PB-290 949.

The Institure for Environmental Studies projects describes solutions which focus on real problems of the man-environment system. These investigations are being conducted by five centers and two groups: (1) The Center for Biotic Systems defines population problems and explores how they can be solved; (2) The Center for Climatic Research studies the sensitivity of cultures to environmental change; (3) The Center for Geographic Analysis investigates interdisciplinary environmental prob-

lems related to geographic aspects, especially land and inland water systems; (4) The Center for Human Systems is concerned with systematic analysis and modeling of human and institutional factors in environmental matters; (5) The Marine Studies Center promotes, coordinates, and conducts research on the marine environment; (6) The Environmental Monitoring and Data Acquisition Group develops research expertise and training opportunities in the realm of environmental acquisition and handling; and (7) The Quantitative Ecosystem Modeling Group develops modeling capability for environmental systems. Specific projects are described in detail.

PB80-100605 PC **A02**/MF **A01**
North Texas State Univ., Denton. Dept. of Biological Sciences.
Foothills Project: Comments on Inadequacies, Environmental Impact Analyses and Evaluation of Alternative Actions.
Final rept.,
Jack A. Stanford. Mar 79, 20p EPA/908/3-79/002

Important scientific literature which describe the limnology of the existing riverine environment, were overlooked in the preparation of statements concerning environmental impacts of the proposed action. The river in Waterton Canyon will be profoundly affected by construction of the Strontia Springs Dam. Downstream from the dam riverine environment will be characterized by compacted substrata (due to sluicing effect of discharge), luxurant growths of benthic algae (due to lack of sediment scour and presence of adequate growth nutrients), and depressed thermal regime (due to thermal stratification in the reservoir and hypolimnial release from the dam). Although a fishery may be sustained in the reservoir tailwaters, these changes should be considered as negative impacts in terms of the existing environment.

PB80-101132 PC **A02**/MF **A01**
Virginia Highway and Transportation Research Council, Charlottesville.
Installation of Raised Pavement Markers for Reducing Incidences of Wrong-Way Driving in Snowplow Regions.
Final rept.,
Frank D. Shepard. Jul 79, 19p VHTRC-80-R4, FHWA/VA-80/04
See also PB-275 739.

Recently completed research had proven the feasibility of using raised pavement markers to alert wrong-way drivers to their errors. In that research, however, the raised markers had been placed only in areas where snowplowing was not a problem; therefore, the research described in the present report was undertaken to determine if problems would be encountered in adapting the system employing the raised markers to areas where snowplowing is prevalent. Based on the results of this research, it is believed that the method described for placing the raised pavement markers is effective in protecting them from damage by snowplows. The method of grooving allows the markers to be protected from damage and provides effective retroreflection for warning wrong-way drivers. It is recommended that the system of raised pavement markers placed as noted in this report be considered for placement at ramp areas or similar locations where wrong-way entries are a problem.

PB80-101140 PC **A02**/MF **A01**
Illinois State Dept. of Transportation, Springfield. Bureau of Materials and Physical Research.
CRC Pavements in Illinois.
Final summary rept. Oct 59-Dec 78,
Jagat Singh Dhamrait. May 79, 21p PHYSICAL RESEARCH-84, FHWA/IL/PR-084

Determining the economic feasibility and the behavior of continuous reinforcement in portland cement concrete (PCC) pavement and developing essential design criteria are principal objectives of the research this report summarizes. Between 1963 and 1971, experimental continuously reinforced concrete (CRC) pavements were constructed in seven highway districts to gain construction experience and to observe service behavior. Early failures revealed that CRC pavements require more careful construction procedures than conventional jointed pavements and, as the pavements aged, load failures attributed to poor drainage, greater than anticipated traffic loads, and concrete disintegration (D-cracking) became evident, particularly in the 7-inch slabs. A 1970 examination of reinforcement disclosed that no significant corrosion existed in the experimental pavements, even though water did penetrate each investigated crack. More recently, lug anchors, originally used to restrain pavement movement, have rotated, causing a rough-riding bump at each lug. Illinois' design policy currently provides for at least an 8-inch-thick slab (steel depth 3 inches below the surface) overlying a stablized subbase. Wide-flange beam terminal joints accommodate end movements and, where needed, underdrains are located along the edge of the pavement subbase. CRC overlays (7-inch minimum) can satisfactorily upgrade structural capabilities, but they should not be considered solely for restoring pavement smoothness.

PB80-101157 PC **A06**/MF **A01**
Hampton (Delon) and Associates, Silver Spring, MD.
Proceedings of a Conference on Site Exploration in Rock for Underground Design and Construction Held at Alexandria, Virginia on March 29-31, 1978.
Final rept. 19 Jul 77-31 Mar 79,
Delon Hampton, and Estelle Greenfield. Jul 79, 104p FHWA/TS-79/221
Contract DOT-FH-11-9150
Sponsored in part by American Society of Civil Engineers, Washington, DC.

The conference was developed around a field research study for evaluation of geologic structure using new site exploration techniques which used various new site exploration techniques currently under development or consideration by the FHWA Office of Research. The site chosen for this study was the proposed underground, Forest Glen Metro Station, to be included in D.C. Metro System. Future excavation of this site would allow field verification of the predictions by the various investigators. In addition to descriptions of the site investigation systems employed in this study, these proceedings include a key note address, state-of-the-art presentation and a description of the site geology.

PB80-101165 PC **A03**/MF **A01**
Illinois State Dept. of Transportation, Springfield. Bureau of Materials and Physical Research.
Effect of Subbase Type and Subsurface Drainage on Behavior of CRC Pavements.
Interim rept. May 71-Dec 77,
Jagat S. Dhamrait, and Donald R. Schwartz. May 79, 40p PHYSICAL RESEARCH-83, FHWA/IL/PR-083

As part of an extensive study conducted to determine the significant relationship between the behavior of CRC pavement and various design features, an evaluation was made of four types of subbase and three types of subsurface drainage systems. Deformation of the subbase due to loading and/or subbase erosion under severe climate and moisture conditions can cause severe pavement distress. To prevent or delay these types of pavement distress from developing early in the service life of the pavement, some type of stable subbase and subsurface drainage system is necessary. The pavement behavior, expressed in terms of transverse cracking and deflections, was analyzed and correlated with the type of subbase and type of subsurface drainage system. The investigation also includes the procedure used to evaluate the efficiency of the drainage systems and to expand the knowledge of the stress levels in the steel. The pavement sections containing the various subbases and subsurface drainage systems are performing excellently after 6 1/2 years of service. The lime-stabilized soil mixture as subbase offers the potential for reduced construction costs, and it is recommended that additional sections be built for further evaluation. The subsurface drainage system with longitudinal underdrains placed at the edge of the stabilized subbase was the most efficient in removing free water from beneath the pavement structure and has been adopted by Illinois as the standard treatment for interstate highways.

PB80-101298 PC **A04**/MF **A01**
Geological Survey, Anchorage, AK. Water Resources Div.
Water Resources Data of the Seward Area, Alaska.
Water-resources investigations (Final),
L. L. Dearborn, G. S. Anderson, and Chester Zenone. Dec 78, 53p USGS/WRI-79-11, USGS/WRD/WRI-79/077
Prepared in cooperation with Alaska Dept. of Natural Resources, Anchorage. Div. of Geological and Geophysical Surveys.

Seward obtains a water supply of about 2 million gallons per day primarily from Marathon Springs and the Fort Raymond well field. The springs have supplied up to 800 gallons per minute, and the city's deep wells currently have a combined capacity of about 3,000 gallons per minute. Fresh water is abundant in the area; future public supplies could be derived from both shallow and deep ground water and from stream impoundment with diversion. High deep-aquifer transmissivity at the Fort Raymond well field indicates that additional wells could be developed there. Water quality is generally not a problem for public consumption. A flood potential exists along several streams having broad alluvial fans.

PB80-101306 PC **A03**/MF **A01**
Geological Survey, Tallahassee, FL. Water Resources Div.
Saltwater-Barrier Line in Florida: Concepts, Considerations, and Site Examples.
Water-resources investigations,
Jerry L. Hughes. Jun 79, 35p USGS/WRI-79-75, USGA/WRD/WRI-79/073
Prepared in cooperation with Florida Dept. of Environmental Regulation, Tallahassee.

Construction of canals and enlargement of streams in Florida has been mostly to alleviate impact of floods and to drain wetlands for development. Land drainage and heavy pumpage from coastal water-table aquifers has degraded potable ground and surface water with saltwater. Control of saltwater intrusion is possible through implementation of certain hydrologic principles. This report briefly reviews the fundamentals of saltwater intrusion in surface-water channels and associated coastal aquifers, describes the effects of established saltwater-barrier lines in Florida, and gives a history of the use and benefits of salinity-control structures.

PB80-101389 PC **A12**/MF **A01**
Texas Univ. at Austin. Center for Highway Research.
Control of Cracking on the Side Faces of Large Reinforced Concrete Beams.
Research rept. (Final),
G. C. Frantz, and J. E. Breen. Sep 78, 261p CFHR-3-5-76-198-1F, FHWA/TX-78-198-1F
Sponsored in part by Texas State Dept. of Highways and Public Transportation, Austin. Transportation Planning Div.

Several large reinforced concrete highway bent cap girders, designed according to ACI and AASHTO provisions, were found to have very wide cracks near middepth on the side faces. Although the crack width at the level of main reinforcement was acceptable, the side face cracks near middepth were up to three times as wide. This indicated potential durability problems. A 3/8 scale laboratory model using deformed bars and reduced maximum size aggregate accurately reproduced the crack pattern and crack widths of the full size bent caps. A simplified test specimen was developed to accurately simulate the behavior of a portion of a beam under constant moment loading. A series of 44 specimens investigated the variables affecting side face cracking: amount and distribution of side face reinforcement, cover, web width, and beam depth. A relatively simple two-dimensional finite element analysis generally confirmed the laboratory results. A new design procedure was developed to control side face crack widths and was simplified for code use. To verify the new design procedure, the original model bent cap with the serious side face cracking problem was redesigned and tested. The procedure worked very well. Although the new procedure requires substantially more side face reinforcement for large beams than present provisions do, it appears that the side face cracking problem can be controlled at little or no additional cost by considering the flexural strength contribution of the side face reinforcement.

PB80-101470 PC **A11**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Water Supply and Drainage in Buildings.
Final rept.,
Lawrence S. Galowin, and JoAnne R. Debelius.
Aug 79, 232p NBS-SP-553
Proceedings of an International Symposium Held at Washington, DC., on September 28-30, 1976.
Library of Congress catalog card no. 79-600105.
Sponsored in part by National Research Council, Washington, DC. Building Research Advisory Board.

Contents: Water requirements and procedures for estimating the demand for water in buildings; Protecting water quality in buildings; Water and water-related conservation in buildings; Hydraulics of gravity drainage systems; Performance concepts for water supply and drainage systems in buildings; Alternative concepts for transporting and treating wastes within buildings; CIB W-62 purpose, methodology, and fields of work; Standardization structure in Europe; Certification and agreement system in Europe; Research laboratories with CIB interest; Cost benefit of plumbing-Large fringe benefits for sanitary installations by thorough analysis of systems; Economic water supply design based on performance requirements; Production, transport, and use of hot water; Performance requirements for taps--A consensus from Scandinavia; Code structure and standardization in the United States; Potential savings from using reduced-size venting in the United States.

PB80-101645 PC **A06**/MF **A01**
North Dakota Regional Environmental Assessment Program, Bismarck.
Setting and Achieving Goals of ND-REAP (North Dakota-Regional Environmental Assessment Program),
Richard V. Giddings, and Vernard F. Bond. 1979, 101p NSF/RA-790142

The 1975 North Dakota Legislature established a legislative branch research and information program, the Regional Environmental Assessment Program (REAP). The concept of REAP is that of a comprehensive and integrated system for assessment of the impact of natural resource development on economic, social, and environmental parameters. The system was designed to serve primarily the legislature and state agencies; and, secondly, political subdivisions, federal agencies, private industry, institutions of higher education, and the public. Resolution of the following issues concerning REAP are reviewed: REAP as a scientific computing center; providing and developing services; adding staff vs. contractual agreements; charges; funding; geographical area of interest; scientific and technical activities; role with respect to state data; and service to state government. REAP's effort in issue identification and resolution identified problem areas that may be applicable to other states considering development of scientific and technological capabilities for state legislatures.

PB80-101660 PC **A10**/MF **A01**
Colorado School of Mines, Golden. Excavation Engineering and Earth Mechanics Inst.
Mechanical Tunnel Boring Prediction and Machine Design.
Final rept.,
Levent Ozdemir, and Fun-Den Wang. Feb 79, 222p EMI-427, NSF/RA-790161
Grant NSF-APR77-04183
See also report dated 1977, PB-271 978.

Described are research efforts to obtain accurate data to verify previously developed equations for mechanical tunnel boring. Procedures pertinent to machine design and performance were also investigated. A laboratory indentation test procedure was designed to predict field boring performance. Extensive indentation tests were conducted in samples of three rock types, results of which confirmed the applicability of indentation tests as a reliable tool to predict disc cutting forces. Field boring data from an active tunneling site indicate that indentation tests can be used as a means of accurately estimating field boring performance. Prediction equations developed during the course of the first year's research were applied to boring data from four ongoing tunneling projects and actual machine performance. An automatic acquisition system was installed on a tunnel boring machine (TBM) to obtain extensive and accurate boring data. Laboratory linear cutting tests were performed to gain a preliminary understanding of the effect of a cutterhead profile on TBM performance. Good correlation was obtained between theoretical and laboratory results of forces involved in cutting with disc-button cutters. Comments and recommendations are offered concerning the design and operation of TBM. Extensive data, graphs, illustrations and equations are included.

PB80-101710 PC **A07**/MF **A01**
Texas Transportation Inst., College Station.
Methodology for Predicting the Reflection Cracking Life of Asphalt Concrete Overlays.
Research rept. Sep 74-Mar 79,
Frederick P. Germann, and Robert L. Lytton. Mar 79, 150p TTI-2-8-75-207-5, FHWA/TX-79-09-207-5
Sponsored in part by Texas State Dept. of Highways and Public Transportation, Austin. Transportation Planning Div.

An experimental testing procedure has been established in the report, for quantitative analysis of overlays designed to reduce reflection cracking. From this testing procedure the overlay scheme that shows the most resistance to cracking can be chosen. The procedure uses crack propagation tests on overlay samples which are conducted on a machine called the 'overlay tester.' This machine was specifically built to stimulate the displacements resulting from temperature changes in the cracked or jointed pavement or base materials that are beneath an overlay. Various types of overlay samples were investigated on the overlay tester. These include samples with fabric, such as 'Petromat,' and samples composed of different grades of asphalt, AC-5, AC-10, and AC-20; various gradations, open graded, dense graded, and hot sand mixes; and different overlay thickness of one, two, and three inches.

PB80-101777 PC **A03**/MF **A01**
Environmental Protection Agency, Arlington, VA. Office of Noise Abatement and Control.
Environmental and Economic Impact Statement, Noise Emission Regulations for Truck-Mounted Solid Waste Compactors.
Final rept.
Aug 79, 39p EPA/550/9-79/258

This document presents an assessment of the expected environmental benefits and economic effects of the Noise Emission Regulations for Truck-Mounted Solid Waste Compactors. The information presented includes the statutory basis for the action, a summary of the regulation, a description of the existing truck-mounted solid waste compactor environment, the alternatives considered, the expected environmental benefits, the expected economic effects, and conclusions.

PB80-101785 PC **A02**/MF **A01**
Pennsylvania Dept. of Transportation, Harrisburg. Bureau of Materials, Testing and Research.
Pavement Condition Measurement Needs and Methods, Executive Summary.
Final rept.,
W. L. Gramling, J. G. Hopkins, G. Cumberledge, A. Bhajandas, and R. M. Nicotera. Oct 78, 18p PDT-76-18-ES, FHWA/RD-79/67
Contract DOT-FH-11-9161
See also PB80-101793.

The study investigates current practice, selects the best techniques, and recommends equipment and methodology suitable for pavement condition evaluation. It consisted of visits to chosen States to determine pavement properties that can be measured and provide data for management decisions. The information collected was supplemented with a literature search and a limited firsthand review of equipment in use. The recommended roadway property measurements needed for pavement condition evaluation as inputs to pavement management systems are (1) Skid resistance, (2) Roughness, (3) Structural capacity, and (4) Pavement distress used to assist in pavement repair strategy. Suggestions on data processing, storage, and retrieval are also given in the report.

PB80-101793 PC **A07**/MF **A01**
Pennsylvania Dept. of Transportation, Harrisburg. Bureau of Materials, Testing and Research.
Pavement Condition Measurement Needs and Methods.
Final rept.,
W. L. Gramling, J. G. Hopkins, G. Cumberledge, A. Bhajandas, and R. M. Nicotera. Oct 78, 127p PDT-76-18-FR, FHWA/RD-79/68
Contract DOT-FH-11-9161
See also PB80-101785.

Contents:
- Field review of pavement evaluation practices;
- Measurements needed for a pavement condition survey;
- Evaluation of pavement condition measuring equipment and methods;
- Recommended measurement methods and equipment for pavement condition survey;
- Data processing and acquisition methods.

PB80-101843 PC **A10**/MF **A01**
National Inst. for Community Development, Inc., Washington, DC.
Evaluation of Intergovernmental Responsibilities for Maintenance.
Final rept.,
Edward T. Herlihy, and Joel M. Eigen. May 79, 205p FHWA/RD-79/502
Contract DOT-FH-11-9273
See also report dated Mar 75, PB-247 125.

The report presents the results of a project to identify and review the practices and relationships in performing street and highway maintenance within defined political and geographical boundries. The study consists of a literature review, the development of summary issues that affect maintenance organizational structure in performing street and highway maintenance and field visits to nine states for intensive survey and analysis. The study found that there are many instances where roads are being maintained by political entities which are too small to adequately support a full modern maintenance operation. However, the surrender of responsibility for street maintenance by one jurisdiction to another, even under circumstances which might lead to a more efficient operation, is not normally a popular action. The contracting of maintenance services out to another road department (service agreements) which is better equipped to meet the maintenance needs of a smaller jurisdiction is an appropriate administrative, as well as politically feasible alternative.

PB80-101991 PC **A05**/MF **A01**
Transportation Research Board, Washington, DC.
Pavement Distress, Evaluation, and Performance,
Michael I. Darter, Scott A. LaCoursiere, Scott A. Smiley, J. Brent Rauhut, and Freddy L. Roberts. 1979, 83p TRB/TRR-715, ISBN-0-309-02962-7
Library of Congress catalog card no. 79-607814.
Also pub. as ISSN-0361-1981.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418, PC$4.20.

The 10 papers in this report deal with the following areas: structural distress mechanisms in continuously reinforced concrete pavement; response and distress models for pavement studies; distresses and related material properties for premium pavements; evaluation of permanent deformation in asphalt concrete pavements; subjective and mechanical estimations of pavement serviceability for rural-urban road networks; quantifying pavement serviceability as it is judged by highway users; measuring pavement performance by using statistical sampling techniques; laboratory testing of a full-scale pavement: the Danish road-testing machine; utility decision model for pavement recycling; and seasonal and short-term variations in skid resistance.

PB80-102007 PC **A05**/MF **A01**
Environmental Monitoring and Support Lab.-Cincinnati, OH.
Angular Flow Insensitive Pitot Tube Suitable for Use with Standard Stack Testing Equipment.
Final rept.,
W. J. Mitchell, B. E. Blagun, D. E. Johnson, and M. R. Midgett. Jun 79, 88p EPA/600/4-79/042

Five pitot tube designs were tested under various gas flow conditions for accuracy in measuring static and total pressure. The static- and impact-pressure measuring tubes least affected by angular flow were combined and then evaluated in the presence of standard particulate sampling nozzles. Tests were performed on 'S', 'L', Kiel and cylinder pitot tubes and a shielded static-pressure pitot tube. The percent error for each pitot tube was determined as a function of yaw, pitch, orifice size, orifice location, pitot tube size, and velocity. A pitot tube was developed that is accurate within 5% when yawed and pitched + or - 30 degrees even while attached to a standard EPA Method 5 sampling assembly. This pitot tube was field tested at a sewage sludge incinerator, a clay crushing plant and a power plant. Also included in the report are: a summary of the existing literature on design of 'L' pitot tubes; a summary of the present state-of-the-art in sampling stacks with cyclonic flow and the errors involved in such sampling; a recommendation for straightening cyclonic flow by insertion of a venturi throat; and the effect of Reynolds Number on pitot tube accuracy.

PB80-102189 PC **A02**/MF **A01**
National Transportation Safety Board, Washington, DC. Office of Evaluations and Safety Objectives.
Safety Report on the Progress of Improvements in Pipeline Transportation of Highly Volatile Liquids.
Safety rept. 28 Sep 79,
28 Sep 79, 19p NTSB/SR-79/3

The most hazardous liquid products transported by pipelines are highly volatile liquids (HVL), such as liquefied petroleum gas and anhydrous ammonia. Since the Safety Board began investigating HVL pipeline accidents in 1970, it has issued a total of 19 recommendations to the Department of Transportation (DOT) urging adoption of improved safety requirements for these pipelines. In FY 1979 the Safety Board, concerned that needed improvements either have not been implemented or have not been implemented as rapidly as possible, established a safety objective for improved safeguards for HVL pipelines. The objective was two-fold, designed to: (1) Demonstrate the need for improvements, and (2) obtain the commitment of DOT's Materials Transportation Bureau (MTB) to implement standards recommended by the Safety Board. As a result of the Safety Board's accident investigation and safety objective activities, MTB has proposed or adopted new HVL pipeline safety standards which will, when fully implemented, substantially reduce the probability of accidents and the risk of casualties and property losses. However, reduction of the remaining risks to the public safety will require further action by MTB to: (1) Expedite implementation of proposed safeguards; (2) establish safety requirements based upon the population which may be exposed to harm; and (3) establish minimum performance requirements for the prompt detection and rapid isolation of failed sections of HVL pipelines.

PB80-102239 PC **A03**/MF **A01**
Geological Survey, Tallahassee, FL. Water Resources Div.
Appraisal of Uncontrolled Flowing Artesian Wells in Florida.
Water-resources investigations,
Henry G. Healy. Dec 78, 33p USGS/WRI-78-95, USGS/WRD/WRI-79/079
Prepared in cooperation with Florida State Dept. of Environmental Regulation, Tallahassee. Bureau of Water Resources Management.

An estimated 15,000 uncontrolled flowing wells statewide are wastefully discharging about 790 million gallons per day by surface and internal flow. Seventy percent of the discharge, 550 million gallons per day, is from uncontrolled flowing wells in 14 counties in east-coastal and southwest parts of the State. Programs for the control of flowing wells are being carried on by state, county, municipal, or federal agencies in 21 countries.

PB80-102270 PC **A05**/MF **A01**
Geological Survey, Tallahassee, FL. Water Resources Div.
Long-Term Water Supply Potential, Green Swamp Area, Florida.
Water-resources investigations,
Hayes F. Grubb, and A. T. Rutledge. Jan 79, 86p USGS/WRI-78-99, USGS/WRD/WRI-79/080
Prepared in cooperation with Southwest Florida Water Management District, Brooksville.

The Green Swamp is an 870 square-mile area of interspersed swamps and flat uplands located in central Florida about 20 miles west of Orlando and about 30 miles northeast of Tampa. Estimates of principal water budget items are (1) inflow, 52.10 inches of rainfall and less than one-half inch of ground-water inflow and (2) outflow, 10 inches of surface runoff, 2 inches of ground-water outflow, and 40 inches of evapotranspiration. The effects of large-scale pumping from the Floridan aquifer were evaluated using a steady-state finite-difference ground-water flow model. The 274 million gallons per day is equivalent to the estimated natural ground-water outflow plus about 45 percent of the runoff from the Green Swamp.

PB80-102288 PC **A03**/MF **A01**
TRW Environmental Engineering Div., Durham, NC.
NOx Emission Factors for Wood-Fired Boilers.
Final rept. Apr-Jun 79,
Arthur B. Nunn. Sep 79, 37p EPA/600/7-79/219
Contract EPA-68-02-2613

The report gives results of a review of NOx emission data from 14 wood-fired boilers. Types of wood used as fuel included sawdust, chips, shavings, edgings, bark, and other processing residues. Boilers tested ranged in size from 1.5 to 67 MW (4,500 to 200,000 lb steam/hr). The major finding was that wood-fired boilers emit considerably less NOx (on an energy basis) than fossil fueled boilers of comparable size, in spite of the fact that most wood-fired boilers operate with high levels of excess air, a practice normally associated with increased NOx emissions. Average emission factors were 0.3 g NOx per kg fuel for boilers less than 10 MW, and 1.6 g NOx per kg fuel for boilers greater than 10 MW.

PB80-102304 PC **A11**/MF **A01**
Corvallis Environmental Research Lab., OR.
Lake and Reservoir Classification Systems.
Final rept.,
Thomas E. Maloney. Jul 79, 248p EPA/600/3-79/074

This publication contains a series of articles dealing with the trophic classification of lakes and reservoirs. These articles are concerned with the history of lake and reservoir classification systems and their present day use.

PB80-102312 PC **A07**/MF **A01**
Benham-Blair and Affiliates, Inc., Oklahoma City, OK.
Long-Term Effects of Land Application of Domestic Wastewater: Milton, Wisconsin, Rapid Infiltration Site.
Final rept. Jan 76-Nov 77,
Aug 79, 142p EPA/600/2-79/145
Contract EPA-68-02-2363
Prepared in cooperation with Engineering Enterprises, Inc., Norman, OK.

This report presents the findings of a research study on the long-term effects of applying treated domestic wastewater to an infiltration site at Milton, Wisconsin. On the test site a high-rate rapid infiltration method, applying effluent at an estimated rate of 244 m (800 ft) per year, had been used for about 20 years. Water and soil samples from this site were compared with similar samples from an upstream control area not receiving wastewater application.

PB80-102353 PC **A05**/MF **A01**
Tennessee Valley Authority, Muscle Shoals, AL. Office of Natural Resources.
Plume Rise Study at Gallatin and Allen Steam Plants--Data Presentation,
T. L. Crawford, and J. H. Coleman. May 79, 97p TVA/ONR-79/07

This report makes detailed data on plume rise available for independent analysis by other specialists studying atmospheric dispersion. Techniques of data collection and methods of data reduction are detailed. Data from 32 time-averaged observations of the plumes at Gallatin and Allen Steam Plants, their sources, and the meteorological conditions are reported. Most of the data were collected during early to midmorning and are therefore characterized by stable and neutral atmospheric conditions. The data are presented in both a summary and a detailed format.

PB80-102403 PC **A14**/MF **A01**
Illinois Univ. at Chicago Circle. Geotechnical Engineering Lab.
Comparative Cost of Near Surface and Deep Tunnels.
Final rept.,
John F. Peters., Linda G. Peck, and Marshall L. Silver. Jun 79, 303p NSF/RA-790156
Grant NSF-APR76-00315

Comparative cost estimates are presented for deep and shallow tunnels constructed under geologic conditions that are found in major U.S. urban areas. The cost data presented can be used in the pre-design planning of tunnel systems for sewer, water, utilities, and transportation. Particular emphasis was placed on the potential for reducing the overall cost of tunnel projects in urban areas by placing tunnels at greater depths where geologic conditions are more favorable and disruption of the surface environment is avoided. The cost analyses were performed using COSTUN, a comprehensive computer program for estimating the cost of soil and rock tunnels. The geologic conditions assumed for the analysis were modeled after the known conditions in Atlanta, Boston, Chicago, Denver, and Los Angeles. Results of the cost comparison are: (1) the cost of deep underground heading tunnels is much more sensitive to different geologic conditions than is the cost of cut and cover tunnels; (2) for tunnel sizes less than 6 to 10m, deep rock tunneling is less expensive than cut and cover construction; (3) the cost difference between rock tunneling from underground heading and cut and cover construction decreases with tunnel size with the cost of both types of construction being nearly the same for tunnels in the 10 to 12m size range; and (4) the cost of underpinning, utility relocation, and surface restoration associated with cut and cover construction is extremely variable and can sometimes exceed the cost of the basic tunnel construction.

PB80-102460 PC **A13**/MF **A01**
National Public Services Research Inst., Alexandria, VA.
Integrated Safe Driving Information System Development. Volume I. Final Report.
Final rept. 6 Jun 76-28 Feb 78,
A. James McKnight, and Gerry A. Simone. Feb 79, 281p DOT-HS-803 883
Contract DOT-HS-6-01397
See also Volume 2, PB80-102478.
Also available in set of 4 reports PC E14, PB80-102452.

The objective of the project was to develop an integrated system through which States can assure the dissemination of safe driving information to, and its acquisition by, all categories of motor vehicle operators. The System addresses drivers in five subsystems and 16 components within subsystems as follows: Qualification Subsystem--New Drivers, Reading Limited Drivers, Foreign Speaking Drivers; Maintenance Subsystem--Licensed Drivers, Older Drivers, Physically Limited Drivers, New Residents; Advancement Subsystem--Experienced Drivers; Improvement Subsystem--Traffic Violators, Drinking Drivers, Accident-Involved Drivers; Special Vehicle Qualification Subsystem--Motorcycle Operators, Truck and Bus Operators, School Bus Operators, Recreational Vehicle Operators, and Emergency Vehicle Operators. Development of the following project materials is discussed: ISDIS Plan; Catalog of Available Materials; and State Guide. Other materials prepared under the project which also appear at the end of this Report are: Informational Materials Rating System; an Experienced Driver Manual; Ambulance Driver Manual; and School Bus Driver Manual.

PB80-102478 PC **A14**/MF **A01**
National Public Services Research Inst., Alexandria, VA.
Integrated Safe Driving Information System Development. Volume II. System Plan.
Final rept. 6 Jun 76-20 Feb 78,

A. James McKnight, and Gerry A. Simone. Feb 78, 311p DOT-HS-803 884
Contract DOT-HS-6-01397
See also Volume 1, PB80-102460 and Volume 3, PB80-102486.
Also available in set of 4 reports PC E14, PB80-102452.

The report describes a Plan of State and Federal activity designed to improve the flow of safe driving information to operators of motor vehicles. For planning purposes, drivers are divided into five subsystems and 16 target groups as follows: Qualification Subsystem--New Drivers, Reading Limited Drivers, Foreign Speaking Drivers; Maintenance Subsystem--Licensed Drivers, Older Drivers, Physically Limited Drivers, New Residents; Advancement Subsystem--Experienced Drivers; Improvement Subsystem--Traffic Violators, Drinking Drivers, Accident-involved Drivers; and Special Vehicle Qualification Subsystem--Motor Vehicle Operators, Truck and Bus Operators, School Bus Operators, Recreational Vehicle Operators, and Emergency Vehicle Operators. The Plan describes the information requirements, presentational materials, delivery programs, acquisition incentives, implementation requirements, and evaluation techniques appropriate to each target group.

PB80-102486 PC **A04**/MF **A01**
National Public Services Research Inst., Alexandria, VA.
Integrated Safe Driving Information System Development. Volume III. State Guide.
Final rept. 6 Jun 76-20 Feb 78,
A. James McKnight, and Gerry A. Simone. Feb 79, 74p DOT-HS-803 885
Contract DOT-HS-6-01397
See also Volume 2, PB80-102478 and Volume 4, PB80-102494.
Also available in set of 4 reports PC E14, PB80-102452.

The report describes activities that may be undertaken by States to improve the flow of safe driving information to its drivers. The drivers addressed in this Guide fall into four categories on the basis of their information needs: Qualification--Information needed to help drivers attain minimal qualifications for safe driving--addresses new drivers, reading limited drivers, and foreign speaking drivers; Maintenance--Information needed to help drivers maintain their ability to drive safely--addresses licensed drivers, older drivers, and physically limited drivers; Improvement--Information needed to help drivers improve their driving safety--addresses volunteers, traffic violators, and drinking drivers; Special Vehicle Operation--Information needed to help drivers operate vehicles other than automobiles--addresses motorcycle operators, truck and bus operators, school bus operators, recreational vehicle operators, and emergency vehicle operators.

PB80-102494 PC **A06**/MF **A01**
National Public Services Research Inst., Alexandria, VA.
Integrated Safe Driving Information System Development. Volume IV. Catalog of Available Materials.
Final rept. 6 Jun 76-20 Feb 78,
Diane B. Katz, and Gerry A. Simone. Feb 79, 117p DOT-HS-803 886
Contract DOT-HS-6-01397
See also Volume 3, PB80-102486.
Also available in set of 4 reports PC E14, PB80-102452.

The report provides a catalog of informational materials available to assist State highway safety agencies in disseminating safe driving information to drivers. Included in the Catalog are written, audiovisual, instructional, and mass media materials. The Catalog provides the title of the material, a brief description of contents, including length or duration, producer, and preparation date, and the availability of the material, including the name and address of the distributor. This Catalog is intended as a companion to a Guide, which constitutes Volume III of the report series. This Guide identifies target groups of drivers, their information needs, and ways of delivering information to them. The Catalog is organized in terms of the target groups described in the Guide.

PB80-102510 PC **A04**/MF **A01**
Shannon and Wilson, Inc., Seattle, WA.
Foundation Instrumentation/Inclinometer.
Final rept.,
Stanley D. Wilson, and P. Erik Mikkelsen. Jul 77, 60p FHWA/TS-77/219
Contract DOT-FH-11-9215

The inclinometer, first introduced to the engineering profession 25 years ago, has developed into a powerful tool for monitoring the performance of embankments and structures during all phases of construction. The purpose of this presentation is to acquaint highway engineers with the application of the inclinometer to problems involving stability of slopes. This manual was prepared in conjunction with a 45-minute videotape program on the inclinometer instrument. The text presented in this manual is modified from the videotape script.

PB80-102577 PC **A08**/MF **A01**
California Univ., Berkeley. Inst. of Transportation Studies.
Urban Travel Demand Forecasting Project Final Report Series, Volume VII. Aggregation Methods and Tests.
Final rept.,
Fred A. Reid. Jul 78, 158p UCB-ITS-RR-78-6, NSF/RA-780635
Grants NSF-APR74-20392, NSF-GI-43740
See also Volume 3, PB-270 930.

Data for the study from a survey of 771 workers drawn from about half of the San Francisco Bay Area evaluates travel patterns to determine accuracy of quantitative predictions. The choice attribute variables (travel times, costs, etc.) are from highly individualized trip simulations. Presented are two new aggregation methods. The first determines which variables contribute the bulk of aggregation error in a particular setting as a basis for selective disaggregate data collection. A minority of variables can be corrected for aggregation error and they vary with the scale of aggregation. The second method, the utility classification method, has much greater computation efficiency and more systematic implementation criteria than the by-variable-value classification method. Recommendations are made on which aggregation and data collection methods should be used for several planning categories. The report identifies the effort necessary to achieve accurate aggregated predictions for traditional segmented systems and recommends prediction frameworks better matched to planning needs, data resources, and aggregation requirements.

PB80-102635 PC **A07**/MF **A01**
Hydronautics, Inc., Laurel, MD.
Design, Fabrication and Testing of the Air-Jet Oil Boom.
Final rept.,
Steven H. Cohen, and William T. Lindenmuth. Jun 79, 139p EPA/600/7-79/143
Contract EPA-68-03-2497

This novel boom has the capability to divert oil slicks under wave and current conditions that normally preclude the development of conventional booms. Tests at the EPA's OHMSETT facility have demonstrated that this boom can divert oil slicks at 3 knots with 85 percent efficiency when at 30 degrees to the flow. Moreover, with the addition of steep, 4-foot waves, the boom's performance is virtually unchanged. The key operational feature is a continuous, horizontally oriented air jet ejected from along the boom at the water's surface. Overall, each boom module is about 33 feet long and 2 feet in diameter. Major components include two inflatable sections (ducts) to support the continous air-jet nozzle and a center support float/jet pump. Some unique features of the structural design are low draft (1 inch) and excellent compliance to waves. Furthermore, the sections are both lightweight and highly compactible for storage.

PB80-102700 PC **A02**/MF **A01**
Geological Survey, Albany, NY. Water Resources Div.
A Facility Designed to Monitor the Unsaturated Zone During Infiltration of Tertiary-Treated Sewage, Long Island, New York.
Water-resources investigations (Interim),
Robert C. Prill, Edward T. Oaksford, and James E. Potorti. Aug 79, 20p USGS/WRD/WRI-79/072, USGS/WRI-79-48

A facility consisting of a circular recharge basin 6.10 meters in diameter with a central observation manhole was developed on Long Island to study the role of the unsaturated zone during aquifer recharge with tertiary-treated sewage. The manhole extends through most of the 7.5-meter-thick unsaturated zone, which is composed of glacial outwash sand and gravel, and enables collection of water samples and monitoring of dynamic characteristics of the unsaturated zone during recharge experiments. The system contains instrumentation for monitoring infiltration rate, pressure-head distribution, soil-moisture content, ground-water levels, and soil gases. The 24.55-square-meter recharge basin has operated in all seasons intermittently since April 1975 and, as of April 1978, has transmitted 62 million liters of tertiary-treated effluent to the water-table aquifer. Overall performance of the facility indicates that it is suitably designed for monitoring the unsaturated zone during artificial-recharge experiments.

PB80-102957 PC **A02**/MF **A01**
Connecticut Univ., Storrs. Inst. of Water Resources.
Potential Ground Water Pollution from Sewage Sludge Application on Agricultural Land.
Technical completion rept. Jul 76-Sep 79,
R. William Wengel, and Gary F. Griffin. Sep 79, 20p W80-00489, OWRT-A-074-CONN(1)
Contract DI-14-31-0001-6007

Corn for silage was grown for three years on land treated with either annual applications or a single application of limed, dewatered sewage sludge at six rates of application. Yields of silage, heavy metal uptake, soil heavy metals, soil nitrates and soil pH were measured. Soil pH increased under all sludge applications in proportion to rate and total amount of sludge applied. At the highest rate of application, soil pH of the surface layer was 7.7 and 7.2 for annual and single applications, respectively. High soil pH reduced extractability of soil metals and also crop uptake of zinc. Soil Cd, Cu, Ni, Pb and Zn increased with sludge application rate only in the plow layer. No leaching of these metals occurred. Soil nitrates increased with sludge application rate. Leaching and accumulation of nitrates at depths of 244 cm were shown at high application rates. Soil nitrates and soil pH were two factors that would limit sludge application rates in this study.

PB80-102965 PC **A05**/MF **A01**
Geological Survey, University, AL.
Ground-Water Management Techniques for the Control of Salt-Water Encroachment in Gulf-Coast Aquifers.
Summary rept.,
Gary R. Walter, Robert E. Kidd, and George M. Lamb. 1979, 95p W80-00490, OWRT-B-073-ALA(1)

The fresh ground-water resources of the Gulf Shores area of Alabama occur in four principal aquifers. In order of increasing depth, these are designated the Beach Sand aquifer, the Gulf Shores aquifer, the 350-Foot aquifer, and the 500-Foot aquifer. The 350-Foot aquifer and the 500-Foot aquifer contain fresh water at the coastline and may contain fresh water for some distance beneath the Gulf of Mexico. Only in the Beach Sand aquifer can the cases of salt-water contamination be unequivocably attributed to seawater encroachment. Based on the results of numerical modeling and interpretation of the water chemistry, the cases of contamination in the Gulf Shores aquifer may be due to leakage of saline water around well bores, leakage from confining beds and movement of pockets of relic salt water within the aquifer rather than lateral seawater encroachment.

PB80-102999 PC **A16**/MF **A01**
NATO Committee on the Challenges of Modern Society, Brussels (Belgium).
Urban Transportation: Intermodal Consideration and Evaluation of Short Distance Transport Techniques.
Oct 76, 375p NATO/CCMS-57
Report on CCMS: Urban Transportation Pilot Study. NATO furnished.

The project is divided into four parts: (1) Requirements of Short-Distance Transport Systems; (2) Inventory; (3) Assessment and Comparison; and (4) Conclusions. Different groups of people have different requirements with regard to short-dis-

tance transport systems. The study examines the various requirements from the points of view of passengers, town and traffic planning, community/environment, and public transport operators. In each of the areas discussed, judgement criteria can be defined for the various requirements. The inventory is based on three elements: (1) brief system descriptions; (2) description of existing transport systems and their future development; and (3) description of new transport systems. Questionnaires for system data have been developed and annexed to the section containing the system descriptions. The section dealing with the description of existing short-distance transport systems and their future development covers rapid transit railways, tramways, motor buses as well as the system groups dual-mode and dial-a-bus; the difference between the latter two bus systems and the conventional bus consisting, in the first case, in an additional technical component (track-guidance), in the second case, in the operating concept (possibility of ordering or calling a bus). The assessment and comparison of short-distance transport systems can be effected by means of formalised assessment methods or by verbal comparison. Section 1 of chapter 3 outlines the three assessment approaches: (1) cost-benefit analysis; (2) cost-effectiveness analysis, and (3) multi-attribute utility analysis. The chapter 'conclusions' describes cost developments of transport systems.

PB80-103005 PC **A08**/MF **A01**
NATO Committee on the Challenges of Modern Society, Brussels (Belgium).
Urban Travel Forecasting.
Jun 78, 175p CCMS-87
NATO furnished.

More often than not, today's urban transportation planner is being asked to determine the consequences of not making a certain transportation investment rather than to determine what investments need to be made to meet the otherwise unconstrained demand for transport services. By simplifying and achieving a degree of standardization in travel estimation procedures, benefits could accrue to the user nations in the form of time and cost savings as well as broadening the spectrum of conditions under which the forecasting procedure can be expected to operate. The first benefit could result from the application of a less sophisticated, and therefore less costly, forecasting procedure. The latter benefit could result in a cross fertilization of knowledge regarding the consequences of various policy decisions. North American cities can be characterized as relatively low in density, high in auto ownership, and low to moderate in public transit usage. European cities, on the other hand, are generally higher in density, lower in auto ownership, and demonstrate a correspondingly higher transit usage. Under these circumstances, the desirability of a generalized simple and efficient forecasting procedure, suitable for application to a broad range of conditions has become greatly heightened.

PB80-103021 PC **A05**/MF **A01**
Massachusetts Office of State Planning, Boston.
City and Town Centers, A Program for Growth. The Massachusetts Growth Policy Report.
Sep 77, 100p NSF/RA-770872
Grant NSF-ISP76-14305

The report describes local, regional, and state perspectives on growth which have emerged from the Growth Policy process of the State of Massachusetts. Areas of concern such as economic development, housing, taxation, transportation, water treatment and supply, solid wastes, recreation, and residential and commercial growth, stressed most often by more than 330 participating communities are approached from various perspectives and degrees of emphasis and agreement. Thirteen regions of the state are compared in order to seek what is common and distinct in regional development, decision making, areas of consensus and conflict in regional agendas, and the acceptability of regional growth management institutions. On a statewide basis, existing attitudes and activities are compared with local and regional perspectives. Two documents prepared by the Office of State Planning and aimed at improving the performance of state government in the promotion of economic development consistent with sound locational criteria are summarized. Finally, areas of consensus and conflict and of making appropriate recommendations are identified.

PB80-103088 PC **A08**/MF **A01**
Water Resources Council, Washington, DC.
Manufacturing Water Use Requirements. Phase III, National Problem Analysis Second National Water Assessment.
1977, 154p
See also PB-285 747.

The National Problem Analysis was the final analysis phase in the preparation of the Second National Water Assessment identifying and evaluating the Nation's most serious water resources problems. This chapter discusses water withdrawals and consumption by the manufacturing sectors.

PB80-103146 PC **A04**/MF **A01**
NATO Committee on the Challenges of Modern Society, Brussels (Belgium).
Urban Goods Movement.
Jun 78, 59p CCMS-86
NATO furnished. Sponsored in part by Department of Transportation, Washington, DC.

The following six topics have been studied: (1) Traffic Problems (Fr.); (2) Technical Problems (Fr.); (3) Freight Terminals (U.S.); (4) Regulation of Commercial Use, and Planning (U.K.); (5) Demonstration of New Projects (U.S.); and (6) Coordination of Study Methods (U.K.). The first two topics concern the present situation: goods movement on urban roads is becoming increasingly difficult, and creates congestion and nuisances; the second topic highlights certain technical aspects of present delivery problems. The third and fourth topics belong together, Topic 3 studying the frequently recommended solution of local urban freight consolidation terminals, whereas Topic 4 stresses certain commercial, social or town planning aspects which are sometimes contradictory to the purely economic aspect of terminal systems (and more particularly to any 'rational' delivery system). Combining the two topics helps explain why rationalization of expensive operations is difficult to achieve. The last two topics deal with the question in a more general manner. Topic 5 summarizes alternatives for obtaining substantial short, medium or long-term improvements in urban goods movement. Topic 6 suggests means to classify commodities and vehicles for purposes of transportation planning, and suggests that the NATO Committee on the Challenges of Modern Society (CCMS) members seek to achieve greater commonality in classification schemes and commercial law and regulation.

PB80-103179 PC **A06**/MF **A01**
Water Resources Council, Washington, DC.
Erosion and Sedimentation and Related Resources Considerations. Phase III, National Problem Analysis Second National Water Assessment.
1977, 119p
See also PB-285 747.

The National Problem Analysis was the final analysis phase in the preparation of the Second National Water Assessment identifying and evaluating the Nation's most serious water resources problems. This chapter covers overland, streambank, and shoreline erosion and sedimentation processes. It provides information on problem areas, controls, and options for action.

PB80-103286 PC **A04**/MF **A01**
Oklahoma Univ., Norman. School of Civil Engineering and Environmental Science.
Knoxville, Tennessee, Commuter Pool -- Matching Markets to Modes with Paratransit Brokering.
Allen R. Cook, and Charles E. Barb, Jr. Dec 78, 55p UMTA-OK-11-0001-79-6
See also PB80-103278.

The purpose of this paratransit agency case study was to develop basic instructional materials to support university classroom and professional short course training in local paratransit planning. This curriculum material consists of 6 separate documents--a guide and 5 paratransit case studies--titled: Paratransit Resource Guide; The Seattle/King County Commuter Pool Program--Paratransit and Rush Hour Congestion; Colonial Taxi Company of Bethel Park, Pennsylvania--Private Enterprise in Paratransit; The Paratransit Services of the Choanoke Area (North Carolina) Development Association--Rural Transit in Coordinated Human Services Transportation; The Dial-A-Bat Paratransit Service of Brockton, Massachusetts, Area Transit--Public Transit in Coordinated Human Services Transportation; and Knoxville, Tennessee, Commuter pool--Matching Markets to Modes with Paratransit Brokering. The report numbers (UMTA-OK-11-0001-79-1 through UMTA-OK-11-0001-79-6) identify with the sequential order of the titles cited above. Knoxville Commuter Pool was a significant national experiment in community-wide transportation brokerage, particularly in its broad scale implementation of an owner/operator van pool program (47 van pools at the end of 1978), its aggressive promotion of all forms of ridesharing among employers and employees in the area, and in the resolution of barriers (notably state regulations and insurance) to ridesharing brokerage.

PB80-103302 PC **A08**/MF **A01**
Piteau (D. R.) and Associates Ltd., Vancouver (British Columbia).
Rock Slope Engineering Reference Manual. Part A: Engineering Geology Considerations and Basic Approach to Rock Slope Stability Analysis for Highways.
Jan 79, 168p FHWA/TS-79/208-PT-A
Contract DOT-FH-11-9218
See also Part B, PB80-103310.
Also available in set of 8 reports PC E19, PB80-103294.

The report deals with the basic considerations and factors that are necessary for the rational assessment of the stability and design of rock slopes. Such an assessment necessitates an estimate of the long-term performance as well as the immediate behavior of the slope. Factors such as discontinuities, groundwater, lithology and weathering, time factor, dynamic forces, etc. are discussed with this fundamental consideration in mind. Long-term stability assessment requires a quantitative assessment of the physical and mechanical properties of the rock mass which govern its strength, permeability and deformation characteristics. It is only with these considerations in mind, and with a basic understanding of the engineering geology, that the slope condition in terms of stability, remedial measures, etc. can be critically assessed.

PB80-103310 PC **A08**/MF **A01**
Piteau (D. R.) and Associates Ltd., Vancouver (British Columbia).
Rock Slope Engineering Reference Manual. Part B: Methods of Obtaining Geologic Structural, Strength and Related Engineering Geology Data.
Jan 79, 158p FHWA/TS-79/208-PT-B
Contract DOT-FH-11-9218
See also Part A, PB80-103302 and Part C, PB80-103328.
Also available in set of 8 reports PC E19, PB80-103294.

The report concerns the approach and methods that are available to obtain engineering geology data through surface and subsurface investigations and testing for use in the design of rock slopes. In this respect mapping, drilling, geophysical, photogrammetry and other methods are discussed. Strength evaluation includes methods to assess compressive strength, such as field estimates, point load index tests and uniaxial compressive tests. Shear strength testing is also discussed.

PB80-103328 PC **A07**/MF **A01**
Piteau (D. R.) and Associates Ltd., Vancouver (British Columbia).
Rock Slope Engineering Reference Manual. Part C: Approach and Techniques in Geologic Structural Analysis.
Jan 79, 143p FHWA/TS-79/208-PT-C
Contract DOT-FH-11-9218
See also Part B, PB80-103310 anand Part D, PB80-103336.
Also available in set of 8 reports PC E19, PB80-103294.

The report describes the basic methods and approach that is taken to delineating basic areas of

similar geologic structural conditions for purposes of carrying out a rational slope stability analysis. The fundamental steps leading to selection of structural domains are discussed as is the plotting, processing, and interpretation of the raw geologic structural data. The use and application of the stereographic net is fully described and appropriate examples all developed in the practicum to fully illustrate these applications. Typical case histories have been included in the practicums which depict typical geological environments where workers might be required to analyze and design rock slopes.

PB80-103336 PC **A09**/MF **A01**
Piteau (D. R.) and Associates Ltd., Vancouver (British Columbia).
Rock Slope Engineering Reference Manual. Part D: Slope Stability Analysis Methods.
Jan 79, 185p FHWA/TS-79/208-PT-D
Contract DOT-FH-11-9218
See also Part C, PB80-103328 and Part E, PB80-103344.
Also available in set of 8 reports PC E19, PB80-103294.

The report discusses the various methods of slope stability analysis that are used for the different failure modes which are relevant in rock slopes. Basic theoretical aspects are discussed, as are some of the fundamental analysis methods that have been developed by workers in the field. In the Appendix, several typical problems are given which represent typical rock slope engineering problems that occur in practice. Answers to the various problems have been worked out and are described.

PB80-103344 PC **A06**/MF **A01**
Piteau (D. R.) and Associates Ltd., Vancouver (British Columbia).
Rock Slope Engineering Reference Manual. Part E: Rock Slope Stabilization, Protection and Warning-Instrumentation Measures and Related Construction Considerations.
Jan 79, 106p FHWA/TS-79/208-PT-E
Contract DOT-FH-11-9218
See also Part D, PB80-103336 and Part F, PB80-103351.
Also available in set of 8 reports PC E19, PB80-103294.

Remedial measures for rock slopes can consist of stabilization, protection, or warning methods, or a combination of these three basic methods. A description of the three basic approaches which can be used to remedy rock slope problems is as follows: Stabilization Methods-These methods give a positive solution to the problem in that either the driving forces are reduced or the resisting forces are increased; Protection Methods-These methods prevent rock materials which have moved out of place on the slope from reaching the roadway, thus also offering a positive solution to slope stability problems; Warning and Instrumentation Methods-These methods provide a forewarning that movements have taken place, or that failure has occurred and a hazard may be imminent in the vicinity of the roadway.

PB80-103351 PC **A05**/MF **A01**
Piteau (D. R.) and Associates Ltd., Vancouver (British Columbia).
Rock Slope Engineering Reference Manual. Part F: Blasting for Rock Slopes and Related Excavation Considerations.
Jan 79, 85p FHWA/TS-79/208-PT-F
Contract DOT-FH-11-9218
See also Part E, PB80-103344 and Part G (Field Manual), PB80-103369.
Also available in set of 8 reports PC E19, PB80-103294.

The report discusses the basic types of controlled blasting procedures, specifications applying to blasting for surface excavation, monitoring considerations to minimize damage due to blast vibrations, etc. Reference was made to a few of the more relevant publications with the objective of providing a reasonable background for the field engineer.

PB80-103369 PC **A03**/MF **A01**
Piteau (D. R.) and Associates Ltd., Vancouver (British Columbia).
Rock Slope Engineering Reference Manual. Part G (Field Manual): Description of Detail Line Engineering Geology Mapping Method.
Jan 79, 39p FHWA/TS-79/208-PT-G
Contract DOT-FH-11-9218
See also Part F, PB80-103351 and Part H (Appendix), PB80-103377.
Also available in set of 8 reports PC E19, PB80-103294.

The detail line mapping method consists of stretching a measuring tape at waist height, or some other appropriate height depending on the nature of the rock face and toe conditions, along the exposed rock face or tunnel wall and recording the measurements and features of interest of the geological discontinuities that intersect the tape. The basic approach taken is easily adapted to computer based system which can be used to aid with the processing, synthesis, and manipulation of the survey data. It aims to relieve the geologist of much of the tedious clerical work involved in transforming his observations into a model for the rock mechanics engineer but makes no attempt to supplant his judgement. The details of the various procedures for setting up a traverse line and recording features of interest in terms of the slope stability analysis requirements are explained. The basic format of the detail line survey sheet is shown. Genetic descriptions and terms of geological discontinuities which should be used in general mapping are given.

PB80-103377 PC **A03**/MF **A01**
Piteau (D. R.) and Associates Ltd., Vancouver (British Columbia).
Rock Slope Engineering Reference Manual. Part H (Appendix) Chapter 9 of Landslides: Analysis and Control (TRB Special Report 176).
Jan 79, 39p FHWA/TS-79/208-PT-H
Contract DOT-FH-11-9218
See also Part G (Field Manual), PB80-103369.
Also available in set of 8 reports PC E19, PB80-103294.

Rock-slope engineering is concerned not with large landslides but with rock falls of individual blocks, translation of small rock masses, and occasional slides of accumulated debris from gullies, talus slopes, and postglacial slide areas. This chapter discusses the aspects of rock-slope engineering relevant to designing cut slopes and maintaining the long-term efficiency and safety of existing slopes. Discussed are the significant factors in rock-slope design, the procedures for the analysis of rock-slope stability, the general planning involved in extensive rock-slope engineering along transportation corridors, and the stabilization, protection, and warning measures that can be used to remedy rock-slope problems.

PB80-103401 PC **A06**/MF **A01**
Environmental Monitoring and Support Lab., Las Vegas, NV.
Distribution of Phytoplankton in Texas Lakes,
Rept. for 15 Mar-20 Nov 74,
M. K. Morris, W. D. Taylor, L. R. Williams, S. C. Hern, and V. W. Lambou. Jun 79, 121p EPA/600/3-79/070
Prepared in cooperation with Nevada Univ., Las Vegas. Dept. of Biological Sciences.

This is a data report presenting the species and abundance of phytoplankton in the 38 lakes sampled by the National Eutrophication Survey in the State of Texas. Results from the calculation of several water quality indices are also included (Nygaard's Trophic State Index, Palmer's Organic Pollution Index, and species diversity and abundance indices).

PB80-103427 PC **A02**/MF **A01**
Pennsylvania Univ., Philadelphia. Fels Center of Government.
Use of Urban Models: Report on a Survey of Planning Organizations,
Janet Rothenberg Pack. Sep 73, 21p NSF/RA/S-73/064
Grant NSF-GI-37789
See also report dated Oct 73, PB-241 360.

Results of a mail survey of nearly 1500 planning agencies to determine the extent to which urban models are used to guide policy are reported. Urban models are defined as those which comprehend the basic activities of the urban area such as business activity and jobs, households and housing, and government and public policy. Model users are regarded as 'planning' agencies which in this study included cities, counties, joint city-county, regional, state and special purpose agencies. Fifty-three percent completed and returned the questionnaires. Survey results discuss and tabulate the following: (1) extent of model use by various agencies; (2) types of models in use and under development; (3) types of uses by user agencies and developer agencies; (4) degree of model usefulness rated by user agencies and developer agencies; and (5) model sources (e.g., in-house, consultant, other) as reported by user agencies and developer agencies.

PB80-103476 PC **A09**/MF **A01**
National Water Well Association, Worthington, OH.
Proceedings of the National Ground Water Quality Symposium (4th) Held at Minneapolis, MN. on September 20-22, 1978.
Final rept. 6 Feb 78-5 Feb 79.
Aug 79, 179p EPA/600/9-79/029
Grant EPA-R-805747

The Fourth National Ground Water Quality Symposium was held in Minneapolis, Minnesota, September 20-22, 1978. Some of the subject areas discussed were: Hydrology; ground water research; standards; models; water borne diseases; and land application.

PB80-103492 PC **A13**/MF **A01**
PEDCo-Environmental, Inc., Cincinnati, OH.
Assessment of Environmental Impact of the Mineral Mining Industry.
Final rept.,
J. S. Greber, V. P. Patel, E. A. Pfetzing, R. S. Amick, and R. O. Toftner. Jul 79, 289p EPA/600/2-79/107
Contract EPA-68-03-2479

This report presents a multimedia (air, liquid and solid wastes) environmental assessment of the domestic mineral mining industry. The primary objective of the study was to identify the major pollution problems associated with the industry. A secondary objective was to define research and development needs for adequate control of air pollutants and liquid and solid wastes connected with mineral mining. This study provides the EPA with (1) an initial data base on the type and quantity of wastes generated and the treatment and disposal techniques now applied for their control; (2) a data base for technical assistance activities; and (3) the necessary background information to implement research and development programs, to document effective pollution control techniques, and to fill gaps in the data base.

PB80-103575 PC **A07**/MF **A01**
Resources Management Associates, West Chester, PA.
Nonpoint Source Model Calibration in Honey Creek Watershed.
Final rept. Oct 77-Oct 78,
T. H. Cahill, R. W. Pierson, Jr., and B. R. Cohen. Aug 79, 145p EPA/600/3-79/054
Grant EPA-R-805421-01

The U.S. EPA Non-Point Source Model has been applied and calibrated to a fairly large (187 sq. mi.) agricultural watershed in the Lake Erie Drainage basin of north central Ohio. Hydrologic and chemical routing algorithms have been developed. The model is evaluated for suitability as a land management tool in estimating the reduction in sediment associated phosphorus from cultivated land. Results indicate a very different impact for selected best management practices (BMP) estimated using the Universal Soil Loss Equation (USLE) gross erosion approach.

PB80-103625 PC **A06**/MF **A01**
Manhattan Coll., Bronx, NY. Environmental Engineering and Science Program.
Verification Analysis of Lake Ontario and Rochester Embayment Three Dimensional Eutrophication Models.
Final rept.,
Robert V. Thomann, Richard P. Winfield, and John J. Segna. Aug 79, 152p EPA/600/3-79/094

Grant EPA-R-803680030
See also report dated Oct 74, PB-241 046.

A three dimensional time variable model of the phytoplankton and nutrients of Lake Ontario and the Rochester Embayment is examined in detail. The data from the International Field Year on the Great Lakes (IFYGL) are used as the primary data base. The data are summarized and statistically analyzed on a three dimensional grid and segment averages using a 67 segment representation of the lake and a 72 segment representation of Rochester Embayment, are calculated. In addition, averages for eight regions of the lake and lakewide averages for two depth layers are computed.

PB80-103633 PC **A09**/MF **A01**
Michigan Univ., Pellston. Biological Station.
Spatial and Seasonal Structure of Rotifer Communities in Lake Huron.
Final rept.,
Richard S. Stemberger, John E. Gannon, and F. James Bricker. Aug 79, 180p EPA/600/3-79/085
Grant EPA-R-803086, Grant EPA-R-803037

This report presents comprehensive data on species composition and distribution of planktonic rotifers in Saginaw Bay and southern Lake Huron from April to November, 1974. Rotifer species composition and abundance differed greatly between Saginaw Bay and open Lake Huron waters. Through cluster analyses, these differences were empirically related to the physicochemical environment. The results of these analyses suggest that rotifers are valuable organisms in water quality assessment studies. Several species which displayed distribution limited to eutrophic Saginaw Bay stations or to oligotrophic offshore Lake Huron stations were potentially useful as environmental indicators. Based on rotifer data, the greatest impact of Saginaw Bay waters on Lake Huron occurred along the western shore of southern Lake Huron below the mouth of the bay.

PB80-103690 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Recreation Requirements and Related Resource Consideration: Phase III, National Problem Analysis, Second National Water Assessment.
1977, 43p
See also report dated Apr 78, PB-285 747.

The National Problem Analysis was the final analysis phase in the preparation of the Second National Water Assessment identifying and evaluating the Nation's most serious water resources problems. This chapter summarizes water-related recreation data including participation in water-dependent and water-enhanced activities and needs for water surface area.

PB80-103930 PC **A03**/MF **A01**
Water Resources Council, Washington, DC.
Water Use in the Mineral Indusry; Phase III, National Problem Analysis, Second National Water Assessment.
1977, 44p
See also report dated Apr 78, PB-285 747.

The National Problem Analysis was the final analysis phase in the preparation of the Second National Water Assessment identifying and evaluating the Nation's most serious water resources problems. This study details water withdrawals and consumption in the minerals industry for the 21 study water resources regions.

PB80-103963 PC **A05**/MF **A01**
NATO Committee on the Challenges of Modern Society Brussels (Belgium).
Recent Developments in Urban Transportation.
Jun 78, 79p CCMS-82
NATO furnished.

This is a followup report that incorporates a summary of developments in American cities during 1975-1977 and developments in the participating countries since the initial reports were issued. The following topics are discussed: Urban travel forecasting; Demand systems (Dial-a-ride) evaluation; Bus priority systems; Urban goods movements; and Short distance transport techniques.

PB80-104011 PC **A02**/MF **A01**
Water Resources Council, Washington, DC.
Preservation of Natural Areas and Historic Resources. Phase III: National Problem Analysis Second National Water Assessment.
1977, 19p
See also PB-285 747.

The National Problem Analysis was the final analysis phase in the preparation of the Second National Water Assessment identifying and evaluating the Nation's most serious water resources problems. This chapter describes the effect on natural and historic resources that water resources projects may have, some programs designed to protect these resources, and data and research needs.

PB80-104037 PC **A04**/MF **A01**
Water Resources Council, Washington, DC.
Food and Fiber and Related Resources Considerations. Phase III, National Problem Analysis Second National Water Assessment.
1977, 74p
See also PB-285 747.

This study is concerned with estimating the future use of water for agricultural and forestry purposes. Agricultural land and water use are projected according to National and State-Regional perspectives. Problems and conflicts associated with using water and land resources to achieve market goals for production are discussed on the national level.

PB80-104052 PC **A02**/MF **A01**
Public Technology, Inc., Washington, DC.
Urban Consortium for Technology Initiatives.
Annual rept. no. 1.
1975, 13p NSF/RA/G-75/096
Grants NSF-ISR73-05811, NSF-GT-44389

Progress is reported on an effort by the Urban Consortium for Technology Initiatives toward establishing a logical, systematic, and innovative method for determining and addressing the technical needs of America's largest metropolitan areas. The Consortium has created a process to pinpoint specific needs and to identify those having the highest priority in the eyes of elected officials and senior public administrators, as well as supervisory officials from line and operating departments. The Consortium also has succeeded in developing a listing of all needs, categorizing them under general subjects such as transportation, energy, public safety, housing, economic development, and the environment. The report includes an organization chart of the Consortium; task force processes; a description of task forces and user design committees; the problem identification process; and an outline of second year objectives. These focus on responding to members' priorities through the task forces and developing an information exchange system.

PB80-104540 PC **A04**/MF **A01**
Illinois Univ. at Urbana-Champaign. Water Resources Center.
Environmental Observations of a Riparian Ecosystem During Flood Season.
Final rept.,
William J. Mitsch, William Rust, Ann Behnke, and Larry Lai. Aug 79, 72p UILU-WRC-79-0142, W80-00691, OWRT-A-099-ILL(1)
Contract DI-14-31-001-9015

Dynamics of floodplain wetlands along the Kankakee River in Northeastern Illinois were studied during the Spring flood season of 1979. The study involved hydrology, water chemistry and sedimentation measurements. The wetlands study areas were dominated by silver maple (Acer saccharinum) with river birch (Betulanigra), pin oak (Quercus palustris), America elm (Ulmus americana) and swamp white oak (Q. bicolor) as subdominants. The floodplain forest study site was inundated for 62 to 80 days, depending on location during March - May 1979. Flooding was determined to occur at a river discharge of 4000 to 4500 cfs and the floodplain forest was determined to be under water 66 percent of the years for a least 10 days since 1917. Flooding has not occurred at all in only five years during that period. Groundwater showed increasing orthophosphates and decreasing nitrates after floodwater receded.

PB80-104664 PC **A05**/MF **A01**
Purdue Univ., Lafayette, IN.
Feasibility of and Design of Cost Effective Computer-Based Information Systems to Increase Productivity of Present and Future Urban Transportation Systems.
Final rept.,
John W. Drake, and Richard P. Guenthner. Aug 79, 84p DOT/RSPA/DPB-50/79/19
Contract DOT-OS-60148

Telephone information systems for transit riders are examined ranging from informal to highly automated. The interplay of telephone information with other related information sources including signs, maps, schedules, and special sources for visitors was also reviewed. Based on detailed discussion with officials of 39 city transit systems, observation of information operations and inputs from suppliers, indicate that (1) Transit telephone information must be part of a rider-oriented system which ideally should include: Well planned, stable, routes; easy to remember, stable schedules; simple fares; Reliable operation of clean vehicles driven by courteous, knowledgeable drivers; Visible, standard bus stop and vehicle signs with posted routes and schedules; and A standard colored system map and route map/schedule leaflets; (2) Schedules reliability, telephone operator skill level, and transit system appearance are perhaps more important than design of the telephone information system in providing service to customers; (3) In considering computers as one aspect of upgrading existing telephone information systems, it must be recognized that well-trained operators will still be needed to handle special calls and that computerized telephone information should be integrated with scheduling, dispatch and other functions related to the organizations management information system.

PB80-104714 PC **A99**/MF **A01**
Florida Univ., Gainesville. Center for Wetlands.
Cypress Wetlands for Water Management, Recycling and Conservation.
Annual rept. no. 2, 1 Nov 74-31 Oct 75,
Howard T. Odum, and Katherine C. Ewel. 15 Dec 75, 817p NSF/RA/E-75/061
Grants NSF-AEN73-07823, RF-73029

Studies of water, nutrients, geological process, chemical cycles, microbes, vegetation, forestry, wildlife, economics, energetics, and systems are being made in field tests and in comparisons with other swamp sites. Treated sewage from a trailer court is flowing at 1 inch per week into two cypress domes, one severely burned and one unburned. The burned sewage dome, originally perforated with soil pits and water-jetted wells, leaked some coliform bacteria and virus into the groundwater in the first year. Now, in its second year, it is retaining nutrients, heavy metals and micro-organisms. Both sewage domes have anaerobic water and a heavy cover of duckweek, but decomposition of organic matter in this semi-natural anaerobic digester is as fast as in aerobic domes. So far, the cypress swamps seem to be a feasible alternative for wastewater recycling, using the semi-natural interface swamp ecosystems for improving water quality and recharging groundwaters.

PB80-105091 PC **A13**/MF **A01**
California Univ., Berkeley. Inst. of Transportation Studies.
Proceedings of the International Symposium on Traffic Control Systems Held at Berkeley, California on August 6-9, 1979. Volume 1. Resource Papers.
Final rept.,
Wolfgang S. Homburger, and Laura Steinman. Aug 79, 294p UCB/ITS/P-79/2
Contract DOT-FH-11-9452
Also pub. as ISSN-0192-4117.

The volume contains all of the invited resource papers which were delivered at the Symposium. The papers cover topics in the following four areas: concepts and strategies, control equipment, driver communication and information, and analysis and evaluation.

PB80-105133 PC **A05**/MF **A01**
Maryland State Highway Administration, Baltimore.
A Bikeway Criteria Digest.
Digest rept. 1973-77.
1977, 96p FHWA/TS-77/201

The digest is an abstract of Federal Highway Administration research documents as well as similar

references on bikeway facility planning and design. It is intended for use by small government units with limited staff as well as State and Federal agencies with complex specialized staffs. The digest is functionally organized into four major, topical steps; Planning, Location, Design and Operations. Those steps progress from the bikeway planning stage through implementation and post construction. Sufficient content is provided to enable a planner or designer to establish a bikeway facility wherever desired.

PB80-105158 PC **A09**/MF **A01**
Oklahoma State Univ., Stillwater. Dept. of Agronomy.
Agricultural Value of Irradiated Municipal Wastewater Treatment Plant Sludges.
Final rept. 15 Apr 77-30 Sep 79,
M. B. Kirkham, W. J. Manning, and E. H. Bryan. 1979, 183p NSF/RA-790196
Grant NSF-ENV77-04092
See also PB-277 803. Prepared in cooperation with Massachusetts Univ., Amherst.

A study is reported to determine the availability of nutrients and heavy metals in sludge irradiated with high energy electrons for disinfection. Differences among plant species in the ability to absorb heavy metals in irradiated sludge, and heavy metal availability in different types of irradiated sludge are also examined. High energy electrons are used because they are intrinsically safer than radioactive sources. Both irradiated and non-irradiated sludges obtained from the Deer Island Wastewater Treatment Plant of Boston, Massachusetts were used to grow a variety of crops under field and controlled-environment conditions. Results at the end of one and two years indicate that availability of elements in sludge irradiated with high-energy electrons is similar to that of non-irradiated sludge.

PB80-105257 PC **A04**/MF **A01**
Fish and Wildlife Service, Fort Collins, CO. Cooperative Instream Flow Service Group.
Fish and Wildlife Requirements and Related Resources Considerations. Phase III, National Problem Analysis Second National Water Assessment,
Keith Bayha. Jan 78, 59p
Sponsored in part by Water Resources Council, Washington, DC. See also PB-285 747.

The National Problem Analysis was the final analysis phase in the preparation of the Second National Water Assessment identifying and evaluating the Nation's most serious water resources problems. This study describes the fish and wildlife function and the uses and options for riverine, wetlands and coastal, and upland ecosystems.

PB80-105265 PC **A04**/MF **A01**
Washington State Water Research Center, Pullman.
Social, Economic, and Institutional Aspects of Wildlife Enhancement in Irrigated Agriculture: A Study of the Columbia Basin Irrigation Project (Summary),
Blair F. Wolfley, Scott C. Matulich, Race D. Davies, Richard L. Shew, and George H. Bagwell. Sep 79, 71p 30, W80-00633, OWRT-C-7165(6213)(7)
Contract DI-14-34-0001-6213

Declining wildlife populations have raised numerous questions concerning the future of public/private fish and wildlife and agricultural benefits created by irrigation development projects. Interrelationships of wildlife and irrigated agriculture were analyzed in terms of social impacts, economic tradeoffs, and institutional ramifications. A secondary purpose of this study was to establish tradeoffs among resources committed to agriculture and/or wildlife production. The study was interdisciplinary in nature and involved analyses from social, economic, and political/institutional disciplines.

PB80-105653 PC **A18**/MF **A01**
Environmental Protection Agency, Washington, DC.
Proceedings of the Stormwater Management Model (SWMM) Users Group Meeting 24-25 May 1979.
Final rept.,
Harry C. Torno. Jun 79, 420p EPA/600/9-79/026
See also report dated Nov 78, PB-290 742.

The report includes fourteen papers, on various model-related topics. Presented at the semi-annual joint U.S.-Canadian Stormwater Management Model (SWMM) Users Group Meeting, held May 24-25, 1979, in Montreal, Quebec, Canada. Topics covered included applications of the SWMM to urban and rural catchments, the selection of design rainfall events for model use, a description of the Montreal Urban Community's wastewater interception program, several applications of other models in facility planning and design, development of a mini-computer version of the ILLUDAS model, and development of an urban/rural subcatchment hydrologic simulation model (SUBHYD).

PB80-106032 PC **A04**/MF **A01**
Louisiana Dept. of Transportation and Devlopment, Baton Rouge. Research and Development Section.
Texturing of Concrete Pavements.
Final rept. Jun 73-Aug 79,
Sheldon M. Law, and Masood Rasoulian. Aug 79, 52p RR-134, FHWA/LA-79/134
See also report dated Aug 77, PB-271 276.

The purpose of this research study was to document and evaluate the Category II Experimental Concrete Texturing project. Several texturing techniques, were tried and compared in order to determine which concrete pavement texture would perform best in regard to skid resistance, durability non hydroplaning properties, noise levels and uniformity. Initially transverse metal tines produced the highest skid number and the best speed gradient. It was recommended that the texturing technique of a longitudinal burlap drag followed by metal tines applied transversely to the centerline of the concrete pavement, be continued as standard on all new concrete pavements and bridge decks.

PB80-106099 PC **A06**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Environmental Considerations of Selected Energy-Conserving Manufacturing Process Options. Volume XVI. Sulfur Oxides Summary Report.
Final rept.
Aug 79, 111p EPA/600/7-79/141
Contract EPA-68-03-2198
See also Volume 18, PB80-106107.

Arthur D. Little, Inc. undertook a study of the 'Environmental Considerations of Selected Energy-Conserving Manufacturing Process Options'. Some 80 industrial process options were examined in 13 industrial sectors. Results were published in 15 volumes, including a summary, industry prioritization report, and 13 industry oriented reports. This present report summarizes the information regarding particulates in the 13 industry reports. Four parallel reports treat sulfur oxides, nitrogen oxides, solid residues, and toxics/organics. All of these pollutant-oriented reports are intended to be closely used with the original 15 reports.

PB80-106107 PC **A06**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Environmental Considerations of Selected Energy-Conserving Manufacturing Process Options. Volume XVIII. Particulates Summary Report.
Final rept.
Aug 79, 111p EPA/600/7-79/145
Contract EPA-68-03-2198
See also Volume 16, PB80-106099, Volume 19, PB80-106115, and PB-262 977.

Results are published in 15 volumes, including a summary, industry prioritization report, and 13 industry oriented reports. This present report summarizes the information regarding particulates in the 13 industry reports. Four parallel reports treat sulfur oxides, nitrogen oxides, solid residues, and toxics/organics. All of these pollutant oriented reports are intended to be closely used with the original 15 reports.

PB80-106115 PC **A06**/MF **A01**
Little (Arthur D.), Inc., Cambridge, MA.
Environmental Considerations of Selected Energy-Conserving Manufacturing Process Options. Volume XIX. Solid Residues Summary Report.
Final rept.
Aug 79, 107p EPA/600/7-79/161
Contract EPA-68-03-2198
See also Volume 18, PB80-106107.

Arthur D. Little, Inc. undertook a study of the 'Environmental Considerations of Selected Energy-Conserving Manufacturing Process Options'. Some 80 industrial process options were examined in 13 industrial sectors. Results were published in 15 volumes, including a summary, industry prioritization report, and 13 industry oriented reports. This present report summarizes the information regarding sulfur oxide pollutants in the 13 industry reports. Four parallel reports treat nitrogen oxides, particulates, solid residues, and toxics/organics. All of these pollutant-oriented reports are intended to be closely used with the original 15 reports.

PB80-106990 PC **A03**/MF **A01**
New York Sea Grant Inst., Albany.
The Lower Bay Complex.
Monograph no. 29,
Iver W. Duedall, Harold B. O'Connors, Robert E. Wilson, and Jeffrey H. Parker. cMay 79, 50p
NYSSGP-AM-79-002, NOAA-79091301

The Lower Bay complex is the seaward part of New York Harbor and includes Raritan, Sandy Hook, and Lower bays. It connects with Upper Bay through a narrow constriction between Staten Island and Brooklyn. A dynamic and complex estuarine system, the bay complex receives a large, seasonally variable inflow of fresh water originating mainly from the Hudson River with lesser amounts from the Raritan and Passaic rivers. Sewage effluent is also a significant source of fresh water. Because of the variable inflow of fresh water, the distribution of water properties (salinity, nutrients, chlorophyll (a) also varies seasonally. Tides and tidal currents in the bay complex are semidiurnal; their patterns are complicated because of the shape of the bay, the variation in freshwater discharge, Coriolis acceleration, and the intricate connection of waterways. Tidal variations in water properties are large and can be perturbed significantly by storms. Sewage effluent from the New York metropolitan area is the principal source for the high concentrations of nutrients observed in the bay complex.

PB80-107121 PC **A10**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Marine Ecosystems Analysis Program Office.
Chemical Pollutants of the New York Bight; Priorities for Research,
J. S. O'Conner, and H. M. Stanford. Jun 79, 225p
NOAA-79082202

The New York Bight Marine Ecosystems Analysis (MESA) Project of the National Oceanic and Atmospheric Administration (NOAA) is an eight-year interdisciplinary field program involving studies of the New York Bight and of the effects of human influences on this ecosystem. The specific objective of the Project is to determine the fates and effects of contaminants in the New York Bight. The MESA Project sought guidance from a panel of experts to identify the contaminants that are, or may become, the most serious problems in the Bight. This report presents the findings of the investigation.

PNL-RAP-35 PC **A07**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Evaluation of Environmental Impacts of Outer Continental Shelf Petroleum Development in the Pacific Northwest and Alaska.
P. J. Mellinger, J. W. Anderson, and J. R. Vanderhorst. Jun 79, 134p
Contract EY-76-C-06-1830

The scope of this report is to: describe the development of petroleum reserves on the Oregon, Washington, and Alaskan outer continental shelves (OCS); characterize the technology applicable to OCS development; identify the routine discharges to the marine and estuarine environment resulting from the petroleum resource develop-

ment of the OCS; and discuss any possible ecological impact from these routine discharges. Components of the routine discharges to the marine environment from OCS development include metals in produced water, drilling muds, and borehole cuttings and chemicals in drilling mud. Hydrocarbons and oils are discharged to the oceans from ships' bilges and produced water and to the atmosphere as combustion products from ships and platform power generation sources and as evaporation products from offshore and land-based storage tanks. The number of discharged species is large and they occur as dissolved species, or suspended or settleable solids. Offshore technologies do exist to assure that the concentrations of discharged pollutants to the oceans and atmosphere are kept to a level that complies to regulatory limits. Where sufficient effluent data exist, it is concluded that long-term ecological effects from routine discharges have not been detected and appear not to occur. However, no environmental data gathered to date are sensitive enough to test a scientific hypothesis of the nature or magnitude of impact that would occur to a site-specific population or ecosystem from this type of release. Short-term effects are localized and short-lived and are therefore ecologically insignificant. (ERA citation 04:050590)

PNL-RAP-36 PC **A09**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Regional Issue Identification and Assessment (RIIA). Volume I. AN Analysis of the TREND-LONG MID-MID Scenario for Federal Region 10.
G. L. Wilfert, M. A. Beckwith, C. E. Cowan, and G. R. Keizur. Jul 79, 200p
Contract EY-76-C-06-1830

Environmental, human health and safety, socio-economic and institutional impacts of future energy development for Federal Region 10, which includes the states of Alaska, Idaho, Oregon, and Washington, are reported. It is concluded that the reduction in electric generating capacity of 568 MWe specified by the scenario for Alaska will not be realized because of institutional constraints and economic impacts. Development of 1000 MWe of geothermal generating capacity in Region 10 called for by the scenario will not be met by 1990. Besides technical feasibility and economic constraints, procedures in Oregon and Washington for securing leases and siting permits have not been fully developed. The location and impacts associated with construction and operation of oil and gas transshipment facilities such as the proposed pipeline to transport natural gas from fields in northern Alaska to the lower 48 states and the pipeline to transport Alaskan oil through Washington State to refineries in the Midwest are likely to be important issues in the Region. The addition of 7,951 MWe to the currently existing hydroelectric generating capacity of 29,990 MWe by 1990 will intensify competition among multiple uses of limited water resources of the Columbia and Snake River systems which drain Idaho, Oregon, and Washington. Irrigation, recreation, transportation, maintenance of wildlife habitats and anadromous fisheries conflict and compete with hydroelectric power generation. Public opposition to further development of nuclear power currently exists and seems to be intensifying in light of recent events. The scenario-specified addition of 4,816 MWe of nuclear generating capacity to the Region's current nuclear capacity of 2,016 MWe may be jeopardized by this opposition; specifically the 1,174 MWe addition to Oregon's nuclear capacity may not be realized. (ERA citation 04:050162)

RLO-2229/T15-7 PC **A14**/MF **A01**
Alaska Univ., Anchorage. Arctic Environmental Information and Data Center.
Comprehensive Bibliography and Index of Environmental Information for the Northwest and Lower Yukon-Kuskokwim Areas of Alaska.
E. H. Buck, A. Allen, R. B. Olshansky, M. Mitchell, Jr., and M. S. Wilson. Jan 79, 320p
Contract EY-76-S-06-2229-015

This bibliography and index was compiled to provide increased access to environmental information pertinent to the Northwest and lower Yukon-Kuskokwim areas of Alaska. These two areas were chosen because they are of vital importance from an energy resource standpoint and contain large Native land selections and wilderness withdrawals. The bibliography and index is divided into the following sections: master bibliography; author index; geographic index, including three parts - (a) geographic name with latitude and longitude, (b) latitude and longitude with geographic name, and (c) township and range with geographic name; three maps of the areas covered by the geographic index; earth sciences index; biological (taxonomic) index; and general keyword index. (ERA citation 04:050585)

UCID-18187 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Papago Indian Reservation Water Sample Analyses.
G. H. Higgins. 31 May 79, 20p
Contract W-7405-ENG-48

Results of optical emission spectrographic analyses of water samples collected on the Papago Indian Reservation in Southern Arizona are tabulated. The results are not interpreted or discussed. (ERA citation 04:050586)

13C. Construction Equipment Materials, and Supplies

PB80-101967 PC **A07**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Economic Analysis of Insulation in Selected Masonry and Wood-Frame Walls.
Final rept.,
Stephen R. Petersen. Sep 79, 138p NBSIR-79-1789
Sponsored in part by Department of Housing and Urban Development, Washington, DC. Office of the Assistant Secretary for Policy Development and Research.

This report provides a life-cycle cost-benefit analysis of several alternative methods for insulating 8inch(200 mm) concrete masonry walls in new single-family residences. In addition, a cost-benefit analysis for insulation in wood-frame walls is provided, consistent with the assumptions used in the masonry wall analysis. A dynamic load simulation model, NBSLD, was used to calculate the heating and cooling requirements for a 1176 square foot (110 square milimeters) house with different levels of thermal resistance for both wall types in eight geographic locations. These data are used to calculate the reduction in annual heating and cooling requirements due to several different types of insulation in the cores and furring spaces of the masonry wall and the cavities of the wood-frame wall. Economic analysis is applied to determine estimates of life-cycle savings from insulation for different locations and furnace types in order to determine the most cost-effective insulation level. In general it is found that the maximum economically justifiable level of insulation in the masonry wall is considerably lower than for the wood-frame wall because of the significantly higher cost of insulating masonry walls.

13D. Containers and Packaging

PAT-APPL-6-052 161 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Liquid Storing and Releasing Integrated Assembly.
Patent Application,
Stephen R. Stoecker. Filed 26 Jun 79, 12p AD-D006 309/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Alternate layers of an external fluid impervious member, and of internal perforated honeycomb core members, perforated face sheet members, and fine wire mesh screen members are bonded together to form an integrated assembly, in the form of a sandwich panel, which can be contoured to any desired preselected shape. The core members and the face sheet perforations allow a fluid to fill the honeycomb cores, while the screen members act as a retention (surface tension) system to keep any vapor present from penetrating to the liquid-filled cores.

13E. Couplings, Fittings, Fasteners, and Joints

N79-31614/7 PC **A05**/MF **A01**
Vought Corp. Advanced Technology Center, Inc., Dallas, TX.
Fatigue Life Prediction of Bonded Primary Joints.
Final Report, 1 Feb. 1978 - 15 Mar. 1979.
J. F. Knauss. Sep 79, 78p NASA-CR-159049, ATC-R-92100/9CRL-17
Contract NAS1-15188

The validation of a proposed fatigue life prediction methodology was sought through the use of aluminum butt and scarf joint and graphite/epoxy butt joint specimens in a constant amplitude fatigue environment. The structural properties of the HYSOL 9313 adhesive system were obtained by mechanical test of molded heat adhesive specimens. Aluminum contoured double cantilever beam specimens were used to generate crack velocity versus stress intensity factor data. The specific objectives were: (1) to ascertain the feasibility of predicting fatigue failure of an adhesive in a primary bonded composite structure by incorporating linear elastic crack growth behavior; and (2) to ascertain if acoustic emission and/or compliance measurement techniques can be used to detect flaws.

N79-31626/1 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
A Critical Examination of Stresses in an Elastic Single Lap Joint.
P. A. Cooper, and J. W. Sawyer. Sep 79, 61p NASA-TP-1507, L-12802

The results of an approximate nonlinear finite-element analysis of a single lap joint are presented and compared with the results of a linear finite-element analysis, and the geometric nonlinear effects caused by the load-path eccentricity on the adhesive stress distributions are determined. The results from finite-element, Goland-Reissner, and photoelastic analyses show that for a single lap joint the effect of the geometric nonlinear behavior of the joint has a sizable effect on the stresses in the adhesive. The Goland-Reissner analysis is sufficiently accurate in the prediction of stresses along the midsurface of the adhesive bond to be used for qualitative evaluation of the influence of geometric or material parametric variations. Detailed stress distributions in both the adherend and adhesive obtained from the finite-element analysis are presented to provide a basis for comparison with other solution techniques.

13F. Ground Transportation Equipment

AD-A074 003/5 PC **A04**/MF **A01**
GARD Inc Niles IL
Framework for Ultrasonic Inspection in the Army Tire Retread Process.
Final rept. Oct 78-Apr 79,
I. R. Kraska, T. A. Mathieson, and R. J. Watts. Jun 79, 62p TARADCOM-TR-12449
Contract DAAK30-78-C-0034

This final report presents (a) the results of a field evaluation of the test plan (the plan was completed earlier in the program and submitted under separate cover), and (b) a model for an economic analysis to be performed with the data obtained in a subsequent closed loop evaluation (scheduled for June 79 in Ober-Ramstadt). In summary, we show that a viable evaluation plan was developed, field tested and is ready for use in the planned evaluation. The RRAD ultrasonic tire inspection data analysis verifies previous data and indicates the potential for cost savings. The framework for the cost savings analysis provided herein delineates the suggested analysis rationale and indicates the data required to provide a viable economic analysis.

COO-4535-T1 PC **A09**/MF **A01**
Mechanical Technology, Inc., Latham, NY.
Stirling Engine Electric Hybrid Vehicle Propulsion System Conceptual Design Study. Final Report.
G. Dochat, A. Artiles, J. Killough, A. Ray, and H. S. Chen. Aug 78, 189p

Contract EC-77-C-02-4535

Results of a six-month study to characterize a series Stirling engine electric hybrid vehicle propulsion system are presented. The Stirling engine was selected as the heat conversion element to exploit the high efficiency (> .36), low pollution, multi-fuel and quiet operation of this machine. A free-piston Stirling engine driving a linear alternator in a hermatically sealed enclosure was chosen to gain the reliability, long life, and maintenance free characteristics of a sealed unit. The study performs trade off evaluations, selection of engine, battery, motor and inverter size, optimization of components, and develops a conceptual design and characterization of the total propulsion system. The conclusion of the study is that a Stirling engine electric hybrid propulsion system can be used successfully to augment the battery storage of a passenger vehicle and will result in significant savings of petroleum energy over present passenger vehicles. The performance and range augmentation of the hybrid design results in significant improvements over an all electric vehicle. The hybrid will be capable of performing 99% of the passenger vehicle annual trip distribution requirements with extremely low fuel usage. (ERA citation 04:048880)

DOE/CS-0026/4 PC **A02**/MF **A01**
Department of Energy, Washington, DC. Div. of Transportation Energy Conservation.
Electric and Hybrid Vehicle Program. Quarterly Report, July--September.
Nov 78, 19p

The progress and activities in DOE's Electric and Hybrid Vehicle Program are reviewed. Topics include: (1) Product Improved Vehicles; (2) Propulsion Systems; (3) EHV Certification Procedures; (4) Focus on Small Business; (5) The Near-Term Battery Program; (6) Program Update; (7) Abstracts; (8) Literature; and (9) Personnel Directory. (ERA citation 04:048878)

PB80-100506 PC **A06**/MF **A01**
Transportation Systems Center, Cambridge, MA.
Implications of Fuel-Efficient Vehicles on Ride Quality and Passenger Acceptance: Workshop Proceedings, Woods Hole, Massachusetts, September 6-8, 1978.
Final rept.,
Anna M. Wichansky, and A. R. Kuhlthau. Aug 79, 119p DOT/TSC/RSPA-79/21, NASA-CP-2096
Prepared in cooperation with Virginia Univ., Charlottesville. Dept. of Civil Engineering.

The report summarizes the proceedings of the 1978 workshops on passenger ride acceptance/fuel economy tradeoffs jointly funded by the U.S. Department of Transportation and the National Aeronautics and Space Administration. Four workshops were conducted under the auspices of the Transportation Research Board's Committee A3C11 on Ride Quality and Passenger Acceptance at the National Academy of Sciences Summer Study Center, Woods Hole, Massachusetts, from September 6-8, 1978. Topics of discussion included ride quality and passenger acceptance problems associated with enhanced fuel efficiency of automobiles (Group A) and aircraft (Group B); shifts in intermediate range (100-500 miles) travel from automobiles to public transit (Group C); and implications of increased size disparity for ground transport freight and passenger vehicles using shared guideways (Group D). In each group, major problem areas were identified and strategies for conducting pertinent research were outlined. A glossary of technical terms and a list of workshop participants are also included in the report.

PB80-101272 PC **A18**/MF **A01**
Maryland Univ., College Park. Dept. of Mechanical Engineering.
A Study of Aerodynamic Methods for Improving Truck Fuel Economy,
Frank T. Buckley, Jr., Colin H. Marks, and William H. Walston Jr. Dec 78, 404p NSF/RA-780680
Grant NSF-SIA74-1843

Results of a 3-year program to investigate aerodynamic means to reduce fuel consumption of tractor-trailer trucks are reported. The study considers the benefit of aerodynamic add-on devices to reduce the aerodynamic drag on existing vehicles, and the influence of design alternatives in reducing the drag of future vehicles. Results are obtained for scaled-models in water table and wind-tunnel experiments, and for full-scale vehicles in coastdown and fuel economy tests. Wind statistics, analyzed to estimate national-average highway wind conditions, and basic aerodynamic data obtained in the experiments are used to define a wind-averaged aerodynamic drag, or drag reduction for national-average operating conditions. Drag reductions of both commercial and newly-developed retrofit drag reducing devices are evaluated. Full scale test results indicate that wind turbulence effects cause the full-scale drag reductions produced by retrofit devices to be generally less than those found in the wind tunnel. The decrease is found to be a function of the design of the device and the ambient conditions in which it is used, and is the least for a fairing/gap seal combination which produces wind-averaged aerodynamic drag reductions of up to 36% in wind-tunnel experiments.

PB80-101488 PC **A22**/MF **A01**
Environmental Protection Agency, Arlington, VA. Office of Noise Abatement and Control.
Noise Emission Standards for Surface Transportation Equipment - Regulatory Analysis of the Noise Emission Regulations for Truck-Mounted Solid Waste Compactors.
Final rept.
Aug 79, 501p EPA/550/9-79/257

This document presents the technical data and analysis used by EPA in developing the Noise Emission Regulations for Truck-Mounted Solid Waste Compactors. The information presented includes a detailed description of the truck-mounted solid waste compactor industry and the product; baseline noise levels for current compactors; a description of the measurement methodology; an analysis of the health and welfare impacts and potential benefits of regulation; the noise control technology available; an analysis of the costs and potential economic effects of regulation; the enforcement procedures; existing local, state, and foreign regulations applicable to compactor noise emissions; an analysis of comments to the public docket; and a description of the participation of the public throughout the development of the regulation.

PB80-101827 PC **A07**/MF **A01**
Princeton Univ., N.J. Dept. of Mechanical and Aerospace Engineering.
The Aerodynamics of Tracked Ram Air Cushion Vehicles - Effects of Pitch Attitude and Upper Surface Flow.
Final rept. Sep 73-Feb 79,
T. M. Barrows, H. C. Curtiss, Jr., and W. F. Putman. Oct 79, 142p MAE/TR-1426, DOT-TSC-RSPA-79-17
Contract DOT-TSC-682

Three types of experiments were conducted on geometrically similar models of a Tracked Ram Air Cushion Vehicle (TRACV). The first consisted of wind tunnel tests with the vehicle model positioned within a short segment of stationary guideway. In the second series of tests, the vehicle model was towed through a 300-foot guideway and the equilibrium position was measured as a function of model weight and center-of-gravity location. Techniques for deriving stability information from these data are described. The third type of test used a moving carriage which held the model at a fixed orientation relative to the guideway. The data from these tests indicate some aerodynamic interference between the carriage and the flow over the upper surface of the model. Simplified theories are developed for the flow over the upper surface of the model and for the effect of pitch attitude on the flow under the lower surface. The level of agreement between the theory and the various testing techniques is discussed.

PB80-101975 PC **A02**/MF **A01**
Environmental Protection Agency, Ann Arbor, MI. Standards Development and Support Branch.
A Brief Treatise on the Problems Associated with Using one Vehicle to Determine the Dynamometer Power Absorption for a Second Similar Vehicle.
Technical rept.,
Glenn D. Thompson. Mar 78, 12p LDTP-78-03

The current EPA regulations for exhaust emission certification and fuel economy measurements allow a manufacturer the option of road testing a vehicle to determine a dynamometer adjustment which will subsequently be used for all vehicles of a similar class. In the process of using the road test results from one vehicle to determine the dynamometer adjustment for a second vehicle there is the potential for error. This report briefly discusses the magnitude of these possible errors. Two specific cases are considered. In the first case the error is assumed that good engineering practices are used. In the second case it is assumed that the potential for error is used in a systematic manner to result in a reduced loading for the second vehicle.

PB80-104888 PC **A04**/MF **A01**
Wyle Labs., Colorado Springs, CO. Scientific Services and Systems Group.
Truck Design Optimization Project. Phase II: Analytical Tool Assessment Report.
Technical rept. Oct 78-May 79,
L. Johnson, A. Gilchrist, M. Healy, C. Bush, and G. Sheldon. Aug 79, 58p TDOP/TR-06, FRA/ORD-79/36
Contract DOT-FR-742-4277
See also PB-288 739.

One of the objectives of the Truck Design Optimization Project (TDOP) Phase II is to define the performance of newer Type II freight car truck designs versus the standard, three-piece Type I truck. To accomplish this dynamic performance evaluation, TDOP Phase II will utilize field test data and analytical tools. The analytical tools, consisting primarily of freight car truck simulation models and their supporting computer programs, will be used to extend and interpret the field test results. The purpose of the report is to document the selection of candidate analytical tools from existing models and computer programs for validation and for use in TDOP Phase II. This report establishes the assessment criteria, surveys 59 existing analytical tools, evaluates in detail 16 of the more promising, and from these, selects a set of tools for validation and subsequent use on TDOP Phase II.

PB80-105240 PC **A04**/MF **A01**
Chi Associates, Inc., Arlington, VA.
Executive and Tabular Summary of Air Bag Field Experience. Volume 3, Number 1.
Final rept. 1 Sep 77-31 Aug 78,
Lotta Chi. Aug 79, 54p DOT-HS-805 062
Contract NHTSA-9-6611
See also Volume 1, Number 1, PB-266 933.

The report contains narrative summaries and tables which describe a total of 57 accidents, which were reported to NHTSA during the period September 1, 1977 through August 31, 1978, involving air bag equipped cars. The information was extracted from the NHTSA in-depth reports by accident investigation teams from five regional research stations. In each case, the following data are included: date, location, DOT HS number, type of impact, year and make of air bag equipped vehicle, type of accident, year and make of other vehicle(s) involved, speed of impact, driver and passenger (s) information, their injury codes, damage to the vehicles, and damage codes.

STU-77-6207 PC **A03**/MF **A01**
Svenska Utvecklings AB, Akersberga.
Electrical-Powered Vehicles.
I. Aakerblom. Sep 78, 34p
In Swedish.
U.S. Sales Only.

An electric-powered car has been constructed mostly utilizing standard components. The car has a series-wound direct current motor with brush shift. Centrifugal slipping coupling has been used in order to obtain a soft start. The weight of working order of the car is 1200 kg and the possible distance driven in urban areas is 50 to 60 km. (ERA citation 04:048879)

UCRL-52553(V.2) PC **A13**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Energy Storage Systems for Automobile Propulsion: 1978 Study. 2. Detailed Report.
E. Behrin, C. J. Anderson, H. Bomelburg, M. Farahat, and H. C. Forsberg. 15 Dec 78, 295p

Contract W-7405-ENG-48

Volume 2 details the results for FY 1978 of a national, multilaboratory study of energy-storage propulsion systems for automobiles. Presented are the findings and procedures of the five participating panels, including an evaluation of how changing the relationship between specific peak power and specific energy affects electric vehicle performance. Also included are an update of previous results based on new information obtained from ongoing research and development programs, as well as the results of a national energy impact and market penetration analysis of representative future energy storage vehicles. The report contains six sections: (1) Energy Storage Devices; (2) Energy Storage Propulsion; (3) The Evaluation Process; (4) End-Use Analysis Results and Conclusions; (5) National Energy Impact of Energy Storage Automobiles; and (6) Market Demand Forecast for Energy Storage Automobiles. (ERA citation 04:048875)

13G. Hydraulic and Pneumatic Equipment

PATENT-4 144 906

Not available NTIS

Department of the Army Washington DC

Programmable Fluidic Pressure-to-Electronic Interface System.

Patent,

Maurice F. Funke, and John M. Goto. Filed 14 Jul 77, patented 20 Mar 79, 4p AD-D006 344/6, PAT-APPL-815 624

Supersedes PAT-APPL-815 624-77.

Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A programmable fluid logic module is disclosed which provides an interface between a plurality of fluid input signals in a pressure-to-electric transducer. The module is arranged so that a plurality of valves may be used to provide a particular combination of signals which result in the transmission of a desired signal from the module to a pressure-to-electric transducer. (Author)

13H. Industrial Processes

AD-A074 016/7 PC **A10**/MF **A01**

Army Industrial Base Engineering Activity Rock Island IL

Manufacturing Methods and Technology Program Plan, CY 1979.

Aug 79, 224p

DARCOM's Manufacturing Methods and Technology (MMT) Program Plan is a near to mid-term planning document indicating technology and funding plans. Organization is by individual project within DARCOM's Subordinate Major Commands (SUBMACOMs). A technology problem and solution are presented for each project that is proposed for funding. Projects included in this document are tentative but do indicate the areas of the Army's technology development. (Author)

AD-A074 048/0 PC **A05**/MF **A01**

Harold Leonard Stuart School of Management and Finance Chicago IL Dept of Management Sciences

Design of Incoming Quality Level, Process Quality Level and Optimal Interrelated Lot-by-Lot Single Sampling Plans for a Single Product Multi-Component Multi-Stage Manufacturing System. A User's Manual for DMQS.

Research rept.,

M. Zia Hassan, Thomas W. Knowles, R. Subramaniam, A. Manaspiti, and P. Pantumsinchai. Apr 79, 82p

Contract N00014-76-C-0841

This is a user's manual for computer program for the design of incoming quality level, process quality level and optimal interrelated lot-by-lot single sampling plans for a single-product multi-component multi-stage manufacturing system. Reference: Hassan, M. Z. and Knowles T. W., 'An Optimal Quality Control Design for a Single-Product Serial Manufacturing System', Journal of Quality Technology, Volume 11, Number 1, January, 1979. (Author)

AD-A074 139/7 PC**$12.50**/MF**$12.50**

Army Materiel Development and Readiness Command Alexandria VA

Engineering Design Handbook. Dielectric Embedding of Electrical or Electronic Components.

6 Apr 79, 177p Rept no. DARCOM-P706-315

Contents: Purpose of Dielectric Embedding--Methods of Embedding-Casting, Potting, Impregnation, Encapsulation, Transfer Molding, Coatings (Conformal and Surface Types), Considerations for Choice of Processes, Molds, Etc.; General Inforamtion on Embedding Resins and Procedures for Use; Epoxy Embedding Agents; Polyurethane Embedding Agents; Silicone Embedding Agents; Vapor-Deposited Poly-p-Xylylene Dielectrics; Use of Fillers; Embedments and Electrical Properties; Factors of Resin Purity and Component Cleaning; Protection Against Moisture, Corrosion, and Biological Degradation; Coatings for Circuit Boards and Similar Substrates; Stress; Resin Type Choice; Correction of Defective Embedments; Appendixes; changes in the Technology Up-To-Date Advice on Embedding.

AD-A074 340/1 PC **A06**/MF **A01**

Rockwell International Thousand Oaks CA Science Center

Fundamentals of Plasma Arc Welding.

Final rept. 1 Apr 75-30 Sep 78,

C. B. Shaw, Jr. Aug 79, 102p Rept no. SC5031.8FR

Contract N00014-75-C-0789

A three-year study was made of physical phenomena underlying operation of the plasma-arc welding (PAW) process. Experimental methods were developed to measure plasma spectral intensities during welding, a mathematical method was perfected to compute plasma temperature distributions from the spectral data, and statistical methods were used to extract maximum information from the data and to infer improved values for four ARII transition probabilities. Welds in mild and stainless steels and in Ti-6Al-4V up to 12.7 mm thick were evaluated by metallography and/or by cyclic fatigue studies. At low stress concentration levels PAW was found to reduce cyclic crack growth rates in the weld metal compared to the parent metal. There appears to be evidence that plasma spectroscopy can aid in selection and control of welding parameters. The plasma temperature measurements clarify the mechanism whereby use of auxiliary ports in the PAW torch orifice cup reduces the width of a weld nugget. Simple plasmadynamic models were used to relate orifice geometry to plasma temperature and electrical resistance, and to weld quality, thus accounting for the observation that a convergent orifice enhances weld penetration, reduces weld width, and improves weld nugget geometry without causing double-arcing, while a divergent orifice (which simulates an eroded orifice cup) has the opposite, deleterious, effects. Nine documents are cited in which these results were reported and complete preprints of four journal articles not yet published are included as appendices. (Author)

DOE/ET/2606-4 PC **A03**/MF **A01**

Babcock and Wilcox Co., Alliance, OH. Research and Development Div.

Development of Automated Welding Processes for Field Fabrication of Thick-Walled Pressure Vessels: Electron Beam Method. Fourth Quarterly Report, July 1--September 30, 1978.

C. M. Weber. 1978, 26p

Contract EF-77-C-01-2606

This report is the fourth quarterly report of a project to develop and demonstrate an electron beam welding procedure for welding 8" thick SA 387 Grade 22 Class 2 (2-1/4 Cr--1 Mo) steel. Due to the late arrival of the steel to be used in this project, a six month extension in the completion date has been made. Work is in progress for developing 4-1/2" deep partial penetration electron beam welding procedures. A total of 257 welds have been made to date. Several defects have been encountered and successfully eliminated. The occurrence of a necklace defect, which has been shown to be a cold shut resulting from improper solidification, has not yet been eliminated. It has been observed that the beam oscillation pattern is influential on the behavior of the weld cavity during welding. In the vertical welding position, it has been determined that the use of a welding shoe is required. (ERA citation 04:050294)

N79-31372/2 PC **A02**/MF **A01**

National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.

Survey of Ion Plating Sources.

T. Spalvins. 1979, 25p NASA-TM-79269, E-188

Conf-Presented at 26TH Natl. Vacuum Symp., N. Y., 2-5 Oct. 1979; Sponsored by the AM. Vacuum Soc.

Based on the type of evaporation source, gaseous media and mode of transport, the following is discussed: resistance, electron beam, sputtering, reactive and ion beam evaporation. Ionization efficiencies and ion energies in the glow discharge determine the percentage of atoms which are ionized under typical ion plating conditions. The plating flux consists of a small number of energetic ions and a large number of energetic neutrals. The energy distribution ranges from thermal energies up to a maximum energy of the discharge. The various reaction mechanisms which contribute to the exceptionally strong adherence - formation of a graded sustrate/coating interface are not fully understood, however the controlling factors are evaluated. The influence of process variables on the nucieation and growth characteristics are illustrated in terms of morphological changes which affect the mechanical and tribological properties of the coating.

PB80-100134 PC **A04**/MF **A01**

Small Business Administration, Washington, DC.

Petite Entreprise - L'Implantation d'une Usine (Profitable Small Plant Layout),

John R. Immer. Jan 58, 63p

Text in French. Sponsored in part by Agency for International Development, Washington, DC.

Remaining competitive through expansion of production, adaptation of new methods, enlarging of sites, price reduction, review of production methods, and assembly-line production, are discussed in this translation of an English publication titled 'Profitable Small Plant Layout'. Hiring of specialists and which specialists to consider vs. working with present staff to implement changes, cost as a function of time, and planning for the future taking into consideration floor space, obsolescence, expansion of product line to maximize capabilities, as well as layout of necessary rooms for office-, factory-, storage- and shipping space, are detailed. Time saving through effective planning of production and handling are graphically displayed. Time studies and layout of work areas are analyzed. A bibliography is included.

PB80-100142 PC **A03**/MF **A01**

Small Business Administration, Washington, DC.

Petite Entreprise - Les Manutentions (Improving Materials Handling in Small Plants),

Wilford L. White. Feb 53, 50p SMALL BUSINESS MANAGEMENT SER-4

Text in French. Sponsored in part by Agency for International Development, Washington, DC.

In this translation of an English publication titled 'Improving Materials Handling in Small Plants' is a definition of materials handling given, and its cost as a factor in the cost of the production, distribution and sale of the product discussed. Suggestions for cost reduction through automation, flow charts of reduction in handling time, while considering safety and yield, and choice of equipment are included. A questionnaire to make small business owners aware of different possibilities, is included. Maintenance and optimum utilization of machinery are discussed. A short bibliography, listing organizations and publications, is included.

13I. Machinery and Tools

AD-A074 217/1 PC **A06**/MF **A01**

SKF Technology Services King of Prussia Pa

M-50 Steel Bearing Material Factors for Rolling Element Life Calculations.

Final rept. 18 Dec 77-1 Apr 79,

Frank R. Morrison, John I. McCool, and Nicholas J. Ninos. 1 Apr 79, 114p SKF-AL79T013, USAAVRADCOM-TR-79-35
Contract DAAK50-77-C-0009

This report presents the results of a survey accumulating life results achieved from bearings manufactured from M-50 tool steel. Life data have been analyzed according to an existing computer program, TABACY. Material and lubrication factors have been determined using this data base, enabling a more accurate calculation of the potential life of a bearing. In addition, this report includes experimental endurance life data obtained on three groups of rolling element bearings manufactured of Vacuum Induction Melted Vacuum Arc Remelted (VIMVAR) M-50 steel. The three bearing designs, all of which have a 45 mm internal diameter, consist of a deep groove ball, an angular contact ball, and a cylindrical roller configuration. These types have been run under several operational conditions using circulating Mobil Jet II synthetic lubricating fluid (MIL-L-23699).

CONF-790435-2 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Statistical Techniques for Automating the Detection of Anomalous Performance in Rotating Machinery.
K. R. Piety, and T. E. Magette. 1979, 24p
Contract W-7405-ENG-26
CAM-I international spring seminar, New Orleans, LA, USA, 9 Apr 1979.

The level of technology utilized in automated systems that monitor industrial rotating equipment and the potential of alternative surveillance methods are assessed. It is concluded that changes in surveillance methodology would upgrade ongoing programs and yet still be practical for implementation. An improved anomaly recognition methodology is formulated and implemented on a minicomputer system. The effectiveness of the monitoring system was evaluated in laboratory tests on a small rotor assembly, using vibrational signals from both displacement probes and accelerometers. Time and frequency domain descriptors are selected to compose an overall signature that characterizes the monitored equipment. Limits for normal operation of the rotor assembly are established automatically during an initial learning period. Thereafter, anomaly detection is accomplished by applying an approximate statistical test to each signature descriptor. As demonstrated over months of testing, this monitoring system is capable of detecting anomalous conditions while exhibiting a false alarm rate below 0.5%. (ERA citation 04:050427)

N79-31604/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Evaluation of High-Contact-Ratio Spur Gears with Profile Modification.
D. P. Towsend, B. B. Baber, and A. Nagy. Sep 79, 24p NASA-TP-1458, E-9949

Scoring tests, surface fatigue tests, and single-tooth bending fatigue tests were conducted with four sets of spur gears of standard design and three sets of spur gears of new-tooth-form design. The new-tooth-form and standard gears scored at approximately the same gear bulk temperature of 409 K (277 F). The scoring load for the new-tooth-form gears was 22 percent less than that for the standard gears. The pitting fatigue lives of the standard and new-tooth-form gears were statistically equal for equal Hertz stress, while the surface fatigue life of the nw-tooth-form gears was approximately five times that of the standard gears at the same load. The standard gears failed at a 17 percent higher bending stress than the new-tooth-form gears when stress was calculated by the AGMA method. However, the difference is not statistically significant. The standard gears failed at a tooth load 1.9 times that for the new-tooth-form gears.

N79-31605/5 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Ferrographic Analysis of Wear Debris from Full-Scale Bearing Fatigue Tests.
W. R. Jones, Jr., and S. H. Loewenthal. Sep 79, 19p NASA-TP-1511, E-9827

The Ferrograph was used to determine the types and quantities of wear particles generated during full scale bearing fatigue tests. Deep-groove ball bearings made from steel were used. A tetraester lubricant was used in a recirculating lubricant system containing a 49 micrometers absolute filter. Test conditions include a maximum Hertz stress of 2.4 GPa, a shaft speed of 15,000 rpm, and a lubricant supply temperature of 74 C (165 F). Four fatigue failures were detected by accelerometers in this test set. In general, the Ferrograph was more sensitive (up to 23 hr) in detecting spall initiation than either accelerometers or the normal sepectrographic oil analysis. Four particle types were observed: normal rubbing weather particles, spheres, nonferrous particles, and severe wear (spall) fragments.

N79-31611/3 PC **A03**/MF **A01**
National Centre of Tribology, Risley (England). European Space Tribology Lab.
Rod-End Bearing Evaluation.
K. Parker. Jun 78, 37p ESA-CR(P)-1179
Contract ESA-2588/75-MD

Three types of dry-lubricated spherical rod-end bearings were selected for testing in air and vacuum with the load and rotational speed being typical of the expected operating conditions of such bearings in a satellite mechanism. The mechanical design of these bearings is described together with a list of the materials used in their construction. Six bearings of each type were obtained, which were initially tested in air for 3000 revolutions to evaluate such parameters as torque, radial backlash, and wear. Following a comparison of the results of these air tests, selected bearings were further tested in vacuum over the temperature range -70 C to +70 C. While there was a variation of torque with temperature, the significant result of the vacuum tests was that the torque and wear of the bearings were not degraded in vacuum. Finally, some recommendations for the use of this type of bearing are given.

N79-31612/1 PC **A08**/MF **A01**
British Aerospace Dynamics (Space), Stevenage (England).
Design Study and Development of a Magnetic Bearing Scanning Mechanism (MBSM) for Optical Sensor Applications, Phase 1.
Final Report.
A. J. Harrison, and M. Saka. Jan 79, 169p TP-7721, ESA-CR(P)-1188
Contract ESA-3606/78-NL-AK

The design of a magnetic bearing scanning mechanism for optical sensor applications was studied. Trade-offs and performance analyses were carried out in the critical areas of magnetic bearings, motors, angular encoders, dynamic stability, and control electronics. Comparison is made with a target specification and an overall, optimum design concept is established to an extent that would allow detailed design, manufacture, and testing.

N79-31613/9 PC **A03**/MF **A01**
National Centre of Tribology, Risley (England). European Space Tribology Lab.
Frictional Torque of Angular Contact Ball Bearings with Different Conformities.
M. J. Todd, and K. T. Stevens. Jul 78, 43p ESA-CR(P)-1221
Contract ESA-2584/75-MD

A model for predicting the frictional (or Coulomb)torque in any axially loaded, angular-contact ball bearing, when viscous drag from the lubricant can be neglected, was assessed by comparison with measurement. Calculations from the model, which assumes for simplicity that there is full slip in the spinning/rolling contact, give predicted torques in reasonable agreement with measured torques over a range of ball-to-race conformities. Agreement is improved at very low conformity by taking into account the partial slip conditions. However, for most practical bearings of this type the assumption of full slip is a good approximation and ball spin is the dominant contribution to torque. Results show the torque advantage of decreasing the conformity at constant bearing load, but they also demonstrate that this advantage is lost if the bearing is required to have a constant axial stiffness. The variation in contact angle with load and the fricational contribution of the cage were taken into account. The measured sliding friction coefficients for three types of lubricant were used in the calculations.

PATENT-4 142 296
Not available NTIS
Department of Energy, Washington, DC.
Tool Calibration for Micromachining System.
Patent,
D. M. Miller. Filed 14 Dec 77, patented 6 Mar 79, 26p PAT-APPL-860 653
Supersedes PAT-APPL-860 653-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention discloses a tool calibration system including a tool calibration fixture and a tool height and offset calibration insert for calibrating the position of a tool bit in a micromachining tool system. The tool calibration fixture comprises a yokelike structure having a triangular head, a cavity in the triangular head, and a port which communicates a side of the triangular head with the cavity. Yoke arms integral with the triangular head extend along each side of a tool bar and a tool head of the micromachining tool system. The yoke arms are secured to the tool bar to place the cavity around and a tool bit which may be mounted to the end of the tool head. Three linear variable differential transformer's (LVDT) are adjustably mounted in the triangular head along an X axis, a Y axis, and a Z axis. The calibration insert comprises a main base which can be mounted in the tool head of the micromachining tool system in place of a tool holder and a reference projection extending from a front surface of the main base. Reference surfaces of the calibration insert and a reference surface on a tool bar standard length are used to set the three LVDT's of the calibration fixture to the tool reference position. These positions are transferred permanently to a mastering station. The tool calibration fixture is then used to transfer the tool reference position of the mastering station to the tool bit. (ERA citation 04:050430)

PATENT-4 148 381
Not available NTIS
Department of the Army Washington DC
Coded Actuator.
Patent,
Roy A. Zangrando. Filed 3 Jan 77, patented 10 Apr 79, 10p AD-D006 347/9, PAT-APPL-756 518
Supersedes PAT-APPL-756 518-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An electromechanical coded actuator, upon receipt of the proper combination of electrical pulses, will unlock and cause angular displacement of an output shaft. The device comprises a rotatable notched flange integral with the output shaft, the former being keyed to the housing by a series of flat blades axially movable against a bias. A first solenoid sequentially positions a rotatable index arm over each blade, whereupon a second solenoid actuates the index arm to displace and lock selected blades in a manner to align a notch in each blade with the flange. the latter is then free to be rotated via a clutch-type coupling with the first solenoid. Additional actuation of the rotary solenoid releases the clutch allowing the flange and shaft to be returned to its original position by a spring bias, and also releases the original position by a spring bias, and also releases the displaced blades to lock the flange. An electrical switch actuated by the index arm defines the zero position. (Author)

PATENT-4 149 430
Not available NTIS
Department of the Army Washington DC
Brake for Ball Screw.
Patent,
Erwin F'Geppert. Filed 26 Sep 77, patented 17 Apr 79, 5p AD-D006 354/5, PAT-APPL-836 276
Supersedes PAT-APPL-836 276-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

In a ball screw connected between an actuating motor and load, the improvement comprising a friction brake mechanism carried by the nut section of the screw for automatically locking the nut and screw together when the motor is de-energized. The invention prevents the load from producing dangerously high free-wheeling rotation of the screw that could centrifugally destruct the motor. (Author)

PATENT-4 151 753
Not available NTIS
Department of the Army Washington DC
Lockable Gear-Rack Unit.
Patent,
Erwin F'Geppert. Filed 19 Jan 78, patented 1 May 79, 4p AD-D006 363/6, PAT-APPL-871 161 Supersedes PAT-APPL-871 161-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

In a pinion-rack drive system, an auxiliary lock mechanism for the movable component is furnished. The lock mechanism includes a second rack normally not meshed with the pinion drive gear but potentially meshable therewith when the pinion gear is moved axially parallel to the teeth on the racks. Lock action involves axial adjustment of the pinion gear so that the gear has opposite ones of its teeth (on the gear diameter) locked in the rack teeth, thereby precluding rotation of the pinion gear and translation of the pinion gear along the rack system. (Author)

13J. Marine Engineering

AD-A073 846/8 PC **A04**/MF **A01**
Webb Inst of Naval Architecture Glen Cove NY Center for Maritime Studies
Long-Term Distributions of Stochastic Processes with Application to Ship Hull Stress Statistics.
Final rept.,
Bruce H. Stephan, and Robert B. Zubaly. Dec 78, 71p
Contract N00014-77-C-0357

The mathematical properties of the following probability distributions and their moment generating functions are derived: Weibull distribution; Rayleigh distribution; Exponential distribution; Normal distribution; Voznesensky distribution; and Generalized Rayleigh distribution. The relative merits of applying these distributions to problems in ship responses to the sea, which is described as a stationary stochastic process, are discussed. In Part 2, the most promising long-term distributions derived from the above survey are applied to ship bending stress data from four ships. It is concluded that a numerical solution of long-term distributions, using either Weibull or Normal distributions of the short-term Rayleigh parameters (classified by weather groups) is better than any explicit functions. (Author)

AD-A073 869/0 PC **A04**/MF **A01**
Naval Postgraduate School Monterey CA
Development of a Real-Time Hybrid Computer Simulation for the 3K-SES, 5 DOF, Data-Based Program. Part I - Familiarization and Planning.
Progress report for period ending Jun 79,
Alex Gerba, Jr., and George J. Thaler. Jul 79, 58p Rept no. NPS62-79-008-PT-1

Three degree of freedom approximate models have been developed for the XR-3 and the 3K-SES. Implementation in the IBM 360/67 and comparisons of turning characteristics with the 6 DOF program for the XR-3 and the 5 DOF program for the 3K-SES show good correlation. Hybrid implementation of the 3 DOF model of the XR-3 also shows good correlation. Hybrid implementation of the 3 DOF model for the 3K-SES is in progress, and extension to 5 DOF is being planned. (Author)

AD-A073 870/8 PC **A05**/MF **A01**
Naval Postgraduate School Monterey CA
An Application of Optimal Control Theory to the FFG-7 Gas Turbine Propulsion System.
Master's thesis,
Richard A. Kalyn. Jun 79, 87p

An optimal integral control design program was applied to a linearized state variable model of the FFG-7 ship class gas turbine and Controllable Reversible Pitch (CRP) propeller main propulsion system. Various combinations of output parameters were investigated in an attempt to produce a feasible control design. Only one acceptable design was achieved which did not violate any physical constraints. (Author)

AD-A073 905/2 PC **A03**/MF **A01**
David W Taylor Naval Ship Research and Development Center Annapolis MD Propulsion and Auxiliary Systems Dept
Shipboard, Water and Oil, High Performance Flowmeter Needs in the United States Navy.
Research and development rept.,
Joseph G. Dimmick, and Henry K. Whitesel. Aug 79, 33p Rept no. DTNSRDC/PAS-78-27

The results of a study of present and future Navy shipboard flowmeter needs and applications are presented. Required and desirable performance characteristics are compared with existing Military Specifications, commercially available equipment, and the state of the art. Existing and potential applications are described. Applications described in this report are restricted to water and fuel oils except for a brief discussion of the need for two-phase and steam flowmeters. It is concluded that a universal or general-purpose flowmeter is highly desirable. It should measure mass flow rates with an accuracy of + or - 1 percent over the entire range of flow rates encountered on Navy ships. It should be compatible with all pipe sizes, pipe materials, fluids, temperatures, pressures, and flowstream characteristics. It should be obstructionless, reliable, repeatable, easily calibrated, and easily maintained. Unfortunately, ther is no flowmeter or family of flowmeters available which meet the above requirements. The most likely candidate is an acoustic sensor to measure both flow velocity and fluid density from which mass flow rate could be computed. The most serious unknown is the capability of acoustic techniques involving the transmission of sound through low-density fluids such as steam.

AD-A074 138/9 PC **A02**/MF **A01**
Navy Electronics Lab San Diego CA
Milestones in the NEL Deep Submergence Program.
Special progress rept.
11 Jan 65, 9p Rept no. NEL-1255

This report summarizes the scientific efforts of the Deep Submergence Program at the Navy Electronics laboratory, San Diego, California. Since its inception in 1958, the program has been vitally concerned with development of techniques, instrumentation, and vehicles to fulfill its assignment - research of the marine environment, from the continental shelf to the abyssal sea floor. While NEL's primary interests are in relating applied research data in marine acoustics, biology, geology, and physical oceanography to antisubmarine and submarine warfare projects, the Deep Submergence Program has also added significantly to man's basic knowledge of the ocean sciences. (Author)

AD-A074 162/9 PC **A05**/MF **A01**
Stevens Inst of Tech Hoboken NJ Davidson Lab
Analytical Investigation of the Quadratic Frequency Response for Lateral Drifting Force and Moment.
Final rept. 15 Mar 78-May 79,
C. H. Kim, and J. F. Dalzell. May 79, 81p Rept no. SIT-DL-79-9-2061
Contract N00014-78-C-0313

Results of calculations are given for lateral drifting forces acting on a cylinder and a Series 60 hull derived by a new procedure involving application of the quadratic frequency response function (QFRF) and the close-fit method for flows induced by hull sections in the near field. The near field inductions are required by the QFRF in order to obtain the nonlinear (second order) interaction effects in the presence of dual waves. This method yields the mean drifting force consisting of four components of which the relative-wave-elevation term is dominant, whereas the Bernoulli quadratic term is secondary. A mathematical discontinuity of the drifting force in the neighborhood of a high frequency is investigated by applying a modified Green's function. Mean drifting forces for two forms have been calculated and the results compared with available analysis and model data. A fairly complete quadratic frequency response function for lateral drifting forces in the bi-frequency domain was computed for the Series 60 Ship C sub B = 0.6 at sixty-degree heading. The computed results are presented in a three-dimensional view accompanied by a detailed discussion of the characteristic behavior. (Author)

AD-A074 226/2 PC **A04**/MF **A01**
ARINC Research Corp Annapolis MD
Destroyer Engineered Operating Cycle (DDEOC). System Maintenance Analysis, CG-26 Class Gun Fire Control Systems, SWAB Group 481, SMA 1626-481. Review of Experience,
J. C. Yancy, Jr. Jul 79, 56p Rept no. 1653-07-12-1986
Contract N00024-78-C-4062

This report, the Review of Experience, documents the historical maintenance experience for CG-26 Class Gun Fire Control Systems, SWAB Group 481. It presents an analysis of the existing maintenance policy and recommends specific maintenance actions and maintenance policy modifications to improve system material condition.

AD-A074 227/0 PC **A04**/MF **A01**
ARINC Research Corp Annapolis MD
Destroyer Engineered Operating Cycle (DDEOC), System Maintenance Analysis, CG-16 and CG-26 Class, Navy Tactical Data Systems, SWAB Group 410, SMA 1626-410. Review of Experience,
T. D. Petty, and E. E. Flamboe. Aug 79, 57p Rept no. 1653-07-13-1988
Contract N00024-78-C-4062

This report, the review of experience, documents the historical maintenance experience for both CG-16 and CG-26 Class Navy tactical data systems (NTDS), SWAB group 410. It presents an analysis of the existing maintenance policy and recommends specific maintenance actions and maintenance policy modifications to improve system material condition. (Author)

AD-A074 228/8 PC **A04**/MF **A01**
ARINC Research Corp Annapolis MD
Destroyer Engineered Operating Cycle (DDEOC). System Maintenance Analysis, CG-16 and CG-26 Class Armament Systems, SWAB Group 700, SMA 1626-700. Review of Experience,
M. T. Brown. Aug 79, 55p Rept no. 1653-07-14-1998
Contract N00024-78-C-4062

This report, the review of experience, documents the historical maintenance experience, for both CG-16 and CG-26 Class armament systems, SWAB Group 700. It presents an analysis of the existing maintenance policy and recommends specific maintenance actions and maintenance policy modifications to improve system material condition.

AD-A074 290/8 PC **A08**/MF **A01**
ORI Inc Silver Spring MD
Human and Physical Factors Affecting Collisions, Rammings, and Grounds on Western Rivers and Gulf Intercoastal Waterways. Volume I.
Final rept.,
B. Paramore, R. B. Dayton, J. D. Porricelli, and R. M. Willis. Jan 79, 155p ORI-TR-1456-VOL-1, USCG-D-80-78
Contract DOT-CG-41903-A

This report is the result of a study of accident data involving towboat-barge configurations on the Western Rivers and the Gulf Intercoastal Waterway. The study was done to identify 'any consistent patterns of casual factors...(and to) gain further insights into the extent that human factors are involved in towing vessel collisions, rammings, and groundings.' The study examined all collisions, rammings, and groundings on the waterways that were reported to the Coast Guard during FY 1972-FY1976 and involved at least one towing vessel and barge. The study examined in depth all accidents located in ten mile segments where there

were at least ten accidents during the study period. Navigational charts, traffic density, and monthly river discharge data was obtained for each segment under study. The analysis compared the frequencies of vessel, personnel, and environmental characteristics for accidents grouped by waterway, type of navigational situation in the accident site, and type of accident. The physical factors were interpreted with respect to task performance requirements identified in previous Coast Guard sponsored research. (Author)

PB80-102148 PC **A02**/MF **A01**
National Transportation Safety Board, Washington, DC. Office of Evaluation and Safety Objectives.
Safety Report: Progress Toward Improvements in Marine Steering Reliability.
Safety rept.
21 Sep 79, 20p NTSB/SR-79/1

The reliable operation of vessel steering systems is vital to the prevention of accidents in congested and restricted ports and waterways. Increases in the number and size of ships, particularly those transporting hazardous materials such as crude oil, liquefied petroleum gas and liquefied natural gas, have increased the potential for disastrous consequences when accidents occur. Since mid-1973, the Safety Board has analyzed three accidents caused by steering failure, identified critical safety problems, and issued a total of 17 recommendations to the U.S. Coast Guard urging adoption of improved steering system safety standards. In response to Safety Board recommendations, the Coast Guard has proposed new or improved safety regulations applicable to U.S. vessels, and in some cases, to both U.S. and foreign vessels. However, the Coast Guard has not implemented safety improvements as rapidly as possible and has been reluctant to apply standards unilaterally to foreign vessels which call at U.S. ports in the absence of international acceptance of the standards. The effect is a double standard of safety for U.S. and foreign vessels.

13K. Pumps, Filters, Pipes, Fittings, Tubing and Valves

CONF-790480-1 PC **A02**/MF **A01**
Argonne National Lab., IL.
Long-Term Erosion Monitoring of Metallic Conduits by Ultrasonic Pulse-Echo Techniques.
C. A. Youngdahl, and W. A. Ellingson. 1979, 12p
Contract W-31-109-ENG-38
12. symposium on nondestructive evaluation, San Antonio, TX, USA, 24 Apr 1979.

Erosion monitoring of metallic transfer lines and fittings in pressurized equipment used to process particulate matter, such as pulverized coal or ash, can prevent unexpected component failures and contribute to improved equipment designs. Nondestructive, ultrasonic pulse-echo techniques to detect erosion have been developed for high-temperature (approx. 650 exp 0 C) on-line measurements and applied to various stainless steel and carbon steel components of coal-gasification and liquefaction pilot plants. The techniques are described, together with successful methods of accounting for varying specimen temperatures, long monitoring times (months to years), and exposure of transducers and couplant to weather. Measurement characteristics peculiar to erosion monitoring are discussed. (ERA citation 04:048042)

FE-2355-2(Rev.J) PC **A02**/MF **A01**
Consolidated Controls Corp., El Segundo, CA.
Coal Gasification Valves: Phase II. Quarterly Technical Progress Report, December 1978–February 1979.
Mar 79, 20p
Contract EX-76-C-01-2355

The Type III S/N 2 Valve was acceptance tested, and a structural problem was discovered when the ceramic gate seal disc cracked at 1615 psi pressure. The seal disc has been redesigned and reordered, and is presently scheduled for delivery in mid-April, 1979. The Type III S/N 1 Valve refractory lining was removed. The lining will be recast as the most expedient method of correcting the internal geometry. The first two Type I, II, IV valves were assembled and acceptance tested. Both valves were well within specification, and no unusual occurrences were observed. As a result of the Design and Interface meeting, the control interfaces of the valve are being modified to accommodate the METC control system. This modification involves minor rewiring of the purge control, plus installation of some relays. (ERA citation 04:049438)

METC/SP-79/5 PC **A03**/MF **A01**
Department of Energy, Morgantown, WV. Morgantown Energy Technology Center.
Testing, Evaluation, and Development of Valves for Lockhopper Services in Coal Conversion Processes by the U.S. Department of Energy.
J. F. Gardner. Jun 79, 39p

The U.S. Department of Energy, through the Morgantown Energy Technology Center (METC), has taken on the role of testing and developing valves for various severe service applications in coal conversion and utilization processes. Projects are currently underway for the development of prototype lockhopper valves through development contracts with testing and evaluation by METC. Additionally, a State-of-the-Art (SOA) Lockhopper Valve Test and Evaluation Project continues in an effort to develop modifications to currently available valve designs which will provide reliable, long-life components for existing pilot plants and early demonstration plant service. An overview including objectives and current status of each project will be presented. (ERA citation 04:048051)

PAT-APPL-6-057 465 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, CA.
Pressure Control Valve.
Patent Application,
K. H. Lambson. 13 Jul 79, 12p N79-30553/8, NASA-CASE-ARC-11251-1
Subm-Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A control valve is described which is adapted to be connected between a pressure source, such as a vacuum pump, and a pressure vessel to control the pressure in the vessel. The valve comprises a housing having a longitudinal bore which is connected between the pump and vessel, and a transversely movable valve body which controls the air flow through an air inlet in the housing. The valve body includes cylindrical and conical portions which cooperate with reciprocally shaped portions of the housing to provide flow control. A filter disposed in the air inlet filters out foreign matter in the air. The bottom end of the valve body screws into the valve housing control knob which is formed integrally with the valve body and controls opening and closing of the valve.

SAND-79-8187 PC **A06**/MF **A01**
Bechtel National, Inc., San Francisco, CA.
Technical and Economic Assessment of Solar Powered Water Pumping for Remote Areas. Final Report.
Jul 79, 110p
Contract EY-76-C-04-0789

The technology of solar powered water pumping is reviewed. An overview of the technology and its economics is provided, based on a review and assessment of the open literature. It is shown that pumped water is used most extensively for irrigation, and that new irrigation methods, such as the center pivot system, have significantly increased the water pumping power demand in recent years. The coincidence of the peak irrigation season and peak seasonal insolation makes solar energy a good candidate to supplement or displace depletable energy sources currently used for water pumping. Solar powered water pumping demonstration systems utilizing solar thermal, photovoltaic and wind powered energy conversion. The prime movers of these systems either drive the pumps directly or indirectly through electric power generation. A comparative evaluation of these and other proposed solar concepts was conducted and resulted in the selection of a reference system comprised of a number of individual parabolic dish collectors with integral Brayton cycle engines. This reference system provided a basis for economic comparisons with a typical conventional electric pumping system. It was determined that the cost of power from the reference solar concept will probably not break even with present-day utility-powered pumping systems until at least the turn of the century. (ERA citation 04:049764)

13L. Safety Engineering

PB80-101686 PC **A03**/MF **A01**
California State Dept. of Motor Vehicles, Sacramento. Research, Development and Consultation Section.
The Effects of 'No Action' Negligent Operator Hearings as an Alternative to Hearings Resulting in Probation.
Final rept.,
Marilee E. Garretson, and Raymond C. Peck. Jun 79, 33p CAL/DMV/RSS-79/69
See also report dated Jul 79, PB80-101694.

The main objective of this study was to evaluate the effectiveness of negligent operator hearings in which probation is replaced with the imposition of 'no action.' The sample consisted of 6,489 drivers who attended negligent operator hearings. Of these drivers, 1,247 (19%) were considered high risk and were screened from the no action hearing program. The remaining 5,242 drivers were randomly assigned to either the group that received license status action as recommended (standard treatment) or the group that had no action taken on their licenses (experimental treatment). The results indicated that no statistically significant driver record differences existed between the randomly assigned groups, either 12 months prior, or 12 months subsequent, to treatment. However, the possibility that removal of departmental actions from the individual hearing setting may have had a detrimental effect could not be entirely dismissed. The societal savings associated with the observed (nonsignificant) decrease in fatal and injury accidents, for those drivers not receiving actions, may result in a positive net financial impact for an implemented no action program. The high risk group was examined in an attempt to determine if the high risk screening criteria used in this study were valid. An analysis of the characteristics of the low and high risk groups suggested that the high risk group did not, in fact, have a higher accident expectancy than the nonhigh risk group.

PB80-101694 PC **A03**/MF **A01**
California State Dept. of Motor Vehicles, Sacramento. Research, Development and Consultation Section.
An Evaluation of Probation-by-Mail as an Alternative to Mandatory Hearing Attendance for Negligent Operators.
Beverly Sherman, and Michael Ratz. Jul 79, 37p CAL/DMV/RSS-79/70
See also report dated Jun 79, PB80-101686.

Drivers who became eligible for negligent operator individual hearings, and whose records did not suggest that their inclusion in the program would represent an unacceptable traffic safety risk, were randomly assigned to a group which received the standard hearing or a group which received probation-by-mail. There were no significant differences in the subsequent accident records of the two groups. Drivers in the probation-by-mail group did have significantly more convictions with a resultant increase in probation violator hearings. Those drivers who were screened as high risk and received the standard hearing did not differ significantly from nonhigh risk drivers who received a hearing, with regard to either subsequent accidents or convictions. However, because high risk drivers were not randomly assigned to either an individual hearing or probation-by-mail group, it is not possible to determine, based on the present data, whether probation-by-mail would increase accidents in this subpopulation. A follow-up evaluation will address this question.

PB80-103567 PC **A04**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Railroad Accident Report: Louisville and Nashville Railroad Company Freight Train Derailment and Puncture of Hazardous Materials Tank Cars, Crestview, Florida, April 8, 1979.
13 Sep 79, 62p NTSB-RAR-79-11

See also PB-301 165.

About 8 a.m., on April 8, 1979, 29 cars, including 26 placarded tank cars containing hazardous materials, of Louisville & Nashville Railroad Company freight train No. 403 derailed while moving around a curve between Milligan and Crestview, Florida. Two tank cars of anhydrous ammonia ruptured and rocketed. Twelve other cars containing acetone, methyl alcohol, chlorine, carbolic acid, and anhydrous ammonia ruptured, and their contents either burned or were consumed by fire. Fourteen persons were injured as a result of the release of anhydrous ammonia and other materials or during the evacuation of 4,500 persons. Property damage was estimated to be $1,258,500. The National Transportation Safety Board determines that the probable cause of this accident was the large compressive force generated between the 36th and 37th cars by a combination of excessive train tonnage and improper train handling which caused the 36th car to overturn the outside rail of the curve and derail. Contributing to the severe consequences of the accident was the release of anhydrous ammonia and other hazardous materials, through ruptures and punctures in the sides of the tank cars, which caused all of the injuries and led to the evacuation of 4,500 persons from the area.

PB80-105539 PC **A06**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Mechanical and Industrial Engineering.
Development of a Systems Risk Methodology for Single and Multi-Modal Transportation Systems.
Final rept. Jun 75-Aug 77,
A. H-S. Ang, and J. Briscoe. Jul 79, 114p DOT/RSPA/DPB-50/79/16
Contract DOT-OS-50238

The study was originally conceived with the objective of developing a quantitative procedure for the predictive risk assessment of a given or proposed transportation system. The availability of such a tool for the prediction of expected accident rates is intended to be used for evaluating the effects of specific factors on the level of safety of specific systems (either existing or proposed), and also for extrapolating prior accident statistics in the planning and design of new or expanded systems. During the first year of the program, the overall framework for the systematic risk analysis has been developed, information required for the successful application of the risk model has been delineated and a preliminary determination of the required information base has been identified and developed. Trial or preliminary implementation of the basic risk model to each of the transportation modes under study (air, highway and rail) was examined.

13M. Structural Engineering

AD-A074 202/3 PC **A02**/MF **A01**
VMI Research Labs Lexington VA
Investigation of the Suitability of the Bazant Endochronic Material Model for Modelling the Concrete in a SAMSON Analysis of a Reinforced Concrete Beam.
Final rept. Jan-May 79,
James W. Jeter, Jr. Jul 79, 19p
Grant AFOSR-79-0066

This investigation involved evaluating the potential of the Bazant endochronic (plain concrete model as a possible avenue to an accurate model of the behavior of dynamically loaded reinforced concrete structures. A previous attempt to apply this model to the problem of a dynamically loaded beam was unsuccessful, due to an instability in the computer formulation of the model. In this study it was found that interaction between the tensile cracking model and the SAMSON nonlinear dynamic finite element structural analysis program used for the beam analysis problem resulted in inconsistent definition of the strain behavior experienced by the material, thereby producing instability. A procedure was developed and demonstrated, which successfully eliminated the instability. (Author)

K/CSD/TM-28 PC **A04**/MF **A01**
Oak Ridge Gaseous Diffusion Plant, TN.
UCC-ND Computer-Aided Cost Estimating System: An Overview.
N. H. Van Wie. Apr 79, 56p
Contract W-7405-ENG-26

An overview of the UCC-ND system for computer-aided cost estimating is provided. The program is generally utilized in the preparation of construction cost estimates for projects costing $25,000,000 or more. The advantages of the system to the manager and the estimator are discussed, and examples of the product are provided. 19 figures, 1 table. (ERA citation 04:050915)

N79-31601/4 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Strength of Adhesive-Bonded Hybrid Structures.
L. Kirschke, R. Prinz, and H. Schnell. Jun 79, 39p NASA-TM-75488, DGLR-PAPER-78-180
Contract NASW-3199
Tran-Transl. Into English from "Festigkeit Geklebter Hybridstrukturen" DFVLR, Darmstadt, 19-23 Sep. 1978, DGLR Paper-78-180 36 p. Misc-Original Language Document Was Announced as A79-20021. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif.

Structures prepared from materials with different thermal and mechanical properties by means of fiber-strengthened binders can fail in a number of ways. The present lecture is focused on failures through debonding at the metal or at the fiber-reinforced plastic. A method for calculating the stress distribution in adhesive layers as a function of the load is outlined, and its usefulness in providing insight into the behavior of bonds in hybrid structures is noted. Means of eliminating the unfavorable effects of temperature, humidity, creep and relaxation on the bonds in the manufacture of hybrid structures are examined, along with test methods developed for such structures.

PB80-100001 PC **A09**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Investigation of the Effects of Heating and Air Conditioning on the Performance of Smoke Detectors in Mobile Homes.
Final rept.,
Richard W. Bukowski. Oct 79, 182p NBSIR-79-1915
Sponsored in part by Department of Housing and Urban Development, Washington, DC. Div. of Energy, Building Technology and Standards.

Since its original promulgation in June 1976, the U.S. Department of Housing and Urban Development's Federal Mobile Home Construction and Safety Standard has required the installation of at least one smoke detector to protect the mobile home occupants. The location of the smoke detector was based on earlier tests in a mobile home conducted by NBS in 1976. Because of the limited scope of the earlier NBS tests and subsequent improvements in the design of smoke detectors and the construction of mobile homes, a new series of tests was conducted to evaluate the influences of the operation of central forced-air heating and air conditioning systems on the performance of smoke detectors representative of those which are currently being installed. The tests were conducted with upholstered chairs in smoldering and flaming fire modes, representing key residential fire death scenarios. Tests were conducted in both summer and winter weather conditions. The effects of detector location (wall or ceiling and position within the bedroom corridor) and the effects of open and closed bedroom doors were also investigated. The report concludes that, for the scenarios examined, a properly functioning ionization or photoelectric smoke detector mounted near the ceiling on the inside or outside wall at the living room end of the corridor should provide an alarm in sufficient time for occupant escape.

PB80-101181 PC **A03**/MF **A01**
Swedish Council for Building Research, Stockholm.
Publications Numerical Register, 1977-1978 (of the Swedish Council for Building Research).
1979, 41p

The Swedish Council for Building Research sponsors research and development work on physical planning, building design, building materials and structures, the use and management of buildings and energy conservation in the built environment. The results of the research work are published by the Council in one of the following Building Research Publication Series: R--research reports in Swedish; D--documents, research reports in other languages than Swedish, generally English; T--special publications, generally in Swedish; G--general information material in Swedish or English, such as activity plans, research programmes, lists of publication, project lists etc.; B--information sheets in Swedish; and S--summaries - detailed summaries in English of selected research reports.

PB80-101199 PC **A04**/MF **A01**
Swedish Council for Building Research, Stockholm.
Current Projects, 1978 (of the Swedish Council for Building Research).
1979, 56p

The Swedish Council for Building Research is the central agency in Sweden for the promotion, programming and financing of research into building and urban planning. This publication lists building research projects in progress in December 1978, including those of the National Swedish Institute for Building Research. Recently terminated projects are also included. In addition to the project title, researcher and affiliation, the total grant awarded is also given. The following are the main topic areas of research: Energy conservation in buildings; R&D on urban and regional planning with particular reference to local authority planning; R&D on the planning, construction and management of the built environment; Basic R&D.

PB80-101249 PC **A06**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Building Technology Publications. Supplement 3: 1978,
JoAnne R. Debelius. Jul 79, 110p NBS-SP-457-3
Library of Congress catalog card no. 79-600099.
See also Supplement 2, PB-284 991.

The report presents the National Bureau of Standards' (NBS) Center for Building Technology (CBT) publications for 1978. It is a supplement to Special Publication 457, Building Technology Publications 1965-1975, and covers the period from January 1, 1978 to December 31, 1978. It includes an abstract of each NBS publication, titles and abstracts of papers published in non-NBS media, key work and author indexes, and general information and instructions on how to order CBT publications.

PB80-102858 PC **A12**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Constructed Facilities Div.
Nonlinear Dynamic Response of Reinforced Concrete Frames.
Kenneth Mun Sung Mark. Aug 76, 266p R76-38, NSF/RA-761753
Grant NSF-GI-43106

The purpose of this study is to investigate the applicability of a fiber model to the determination of the nonlinear dynamic response of frames. In this model, the stress and strain are monitored through time at each fiber of several cross sections along each member. The tangent moduli for the steel and concrete resulting from the assumed nonlinear stress-strain relationships are then used to assemble a tangent stiffness matrix for the structure at each step. The dynamic analysis is carried using a central difference formula to advance the solution in time. Several models for the concrete and the steel are first reviewed and compared. The effect of these models on the moment curvature relationship for a cross section is investigated and results are compared to experimental data. The process is repeated for simple members under static cyclic loading. Finally, the fiber model is used to study the dynamic response of a single-bay one-story frame under sinusoidal and earthquake excitation. Results are again compared to experimental data and to those of simpler models.

STU-I-79-1978 PC **A05**/MF **A01**
Styrelsen foer Teknisk Utveckling, Stockholm (Sweden).
Construction Insulation: Heat Transport in Construction Units.
P. Nilsson. 1978, 97p STU-76-4927, STU-77-6696

in Swedish.
U.S. Sales Only.

Architectural regulations concerning insulation are tabulated. Heat transfer concepts are defined and specifications for walls, windows, basement walls, girders or timbers, and floors are given. (ERA citation 04:048820)

14. METHODS AND EQUIPMENT

14A. Cost Effectiveness

AD-A073 968/0 PC **A06**/MF **A01**
Assessment Group Santa Monic CA
Demonstration Model System. Volume I. Mathematical Models,
Thomas M. Neches, and Robert A. Butler. Jul 79, 110p Rept no. AG-PR-A101-VOL-1
Contract N00014-78-C-0465
See also Volume 2, AD-A073 969.

The objective of the project reported in these Volumes is to elucidate the principles of hardware/manpower cost analysis developed in an earlier study, A Framework for Hardware/Manpower Tradeoff Analysis During the Weapon System Acquisition Process. In this Volume, six models are presented. The Level III Model is the most complex and its exposition is used to set notation and explain the underlying concepts of all the models. It is intended to be implemented on a large, production computer. The Level II Model, less complex, was developed for implementation on a stand-alone micro-computer of the sort one might expect to be available to a design team. There are four Level I Models, all developed for use on a programmable calculator. Of the six models, all but the Level III Model have been programmed as part of this project. The Level II Model has been programmed in BASIC on a 48 K microcomputer. A User's Guide and Program Manual for that model constitute Volumes II and III of this study.

AD-A073 969/8 PC **A03**/MF **A01**
Assessment Group Santa Monic CA
Demonstration Model System. Volume II. The Naval Electronics Design Cost Model (NEDCOM): Program Manual,
Thomas M. Neches, and Lynne E. Benner. Jul 79, 44p Rept no. AG-PR-A101-VOL-2
Contract N00014-78-C-0465
See also Volume 3, AD-A073 970.

The Naval Electronics Design Cost Model (NEDCOM) is an interactive computer cost model which estimates the life cycle cost of electronic systems to be deployed in a Navy Shipboard environment. It has been designed to aid the system and component designer in conducting design/cost trade-off analysis, as well as providing a link between the designer and the logistics support specialist. NEDCOM is implemented on an APPLE II desktop computer system. While far more capable and sophisticated than the programmable calculators used for the Level I Slide-Rule cost modles (see Volumes IV and V), the APPLE II is much smaller and less expensive than the full-scale computer systems required for the Level III Model (see Volume I). Some of the main features of NEDCOM are the following. Life cycle cost for individual Lowest Removable Assemblies (LRA) are computed for four levels of repair postures: repair at a contractor operated depot, repair at a military operated depot, local repair, and discard at failure. The lest cost of the four postures is automatically selected and aggregated to system level costs to produce a total system life cycle cost estimate.

AD-A073 970/6 PC **A02**/MF **A01**
Assessment Group Santa Monic CA
Demonstration Model System. Volume III. NEDCOM User's Guide,
Lynne E. Benner, and Thomas M. Neches. Jul 79, 14p Rept no. AG-PR-A101-Vol-3
Contract N00014-7C-C-0465
See also Volume 4, AD-A073 971.

The Naval Electronics Design Cost Model (NEDCOM) is implemented on the APPLE II Computer System. NEDOCM configures a system out of individual Lowest Removable Assemblies (LRA's). The program is capable of handing a system consisting of up to 100 distinct LRA types, each of which is characterized by 7 input variables. In addition, NEDCOM requires as input 61 system-level variables which describe the system operating environment, system manpower and training requirements, system design, and the Naval support environment. The user is given a choice of six different run type options. He can enter new system and LRA data, append a new LRA configuration to an existing system description, alter data previously entered and stored on disk, add additional LRA types to an existing LRA configuration, perform sensitivity analysis on system variables, and finally, run a previously stored system configuration without making any changes. The first two options create new information files which are stored on disk for future use. The third andfourth options are used to alter the information stored on these files. The final two options execute system runs without any changes in stored data.

AD-A073 971/4 PC **A04**/MF **A01**
Assessment Group Santa Monic CA
Demonstration Model System. Volume IV. Slide-Rule Model System Program Manual,
Thomas M. Neches. Jul 79, 57p Rept no. AG-PR-A101-VOL-4
Contract N00014-78-C-0465
See also Volume 5, AD-A073 972.

The Slide-Rule Life Cycle Cost Model System (SRS) has been designed as an aid to system, subsystem ad assembly designers in making cost estimates and trade-offs early in the design process. At this stage it is still possible for cost analysis to influence design - system cost has not yet been 'locked in' due to the lack of flexibility in system configuration which occures in the later phases of design. The SRS consists of four linked programs implemented on a Texas Instruments TI-59 programmable calculator coupled to a TI PC-100A printer. Each program is appropriate to a different design phase and aggregation level. The first estimates the life cycle costs of a system by making simplifying assumptions about its subelements; the second is used for the design of a single Lowest Removable Asembly (LRA); the third estimates system or subsystem costs by aggregating the costs of its subelements, computed in the second program; the fourth is a specialized program used to compute the achieved system confidence level against a stock-out of spare parts.

AD-A073 972/2 PC **A03**/MF **A01**
Assessment Group Santa Monic CA
Demonstration Model System. Volume V. Slide-Rule Model System User's Guide,
Thomas M. Neches. Jul 79, 33p Rept no. AG-PR-A101-VOL-5
Contract N00014-78-C-0465
See also Volume 1, AD-A073 968.

The Level I 'Slide-Rule' Cost Model System is implemented on a Texas Instruments TI-59 programmable calculator coupled to a TI-PC-100A Print/Security Cradle. The model system consists of four linked programs, the Top-Down Model, (TDM) the Lowest Removable Assembly Model (LRAM), the System Aggregation Model (SAM), and the System Confidence Model (SCM). Each program and its data input sets are stored on magnetic cards. The output of each program is used as input to succeeding programs, together with additional input data. The TI-59 has 120 program/data registers, which can be partitioned as desired between program instruction steps and data memory registers. When the calculator is turned on, 60 memory registers are automatically reserved for data storage. All programs other than the TDM use the default allocation. The TDM, however, uses only 40 registers for data storage; the remainder is used to store the program code. Therefore, when running the TDM, the first step after turning on the calculator will be to repartition the memory registers.

14B. Laboratories, Test Facilities, and Test Equipment

AD-A073 859/1 PC **A03**/MF **A01**
Dayton Univ OH
Development and Application of a Laser Velocimeter to Measure Very High Speed Particle Velocities.
Final rept. Nov 77-Sep 78,
James D. Trolinger. Jun 79, 34p AFFDL-TR-79-3067
Contract F33615-76-C-3145
Prepared in cooperation with Spectron Development Labs, Inc., Costa Mesa, CA.

A laser velocimeter was developed for the measurement of the velocity of particles in the size range from 10 to 100 micrometers diameter and velocities up to 5000 meters per second. The instrument was successfully employed in accelerator tests which were conducted during the development of a reentry nose tip erosion and ablation facility. (Author)

AD-A073 914/4 Not available NTIS
Texas A and M Univ College Station Dept of Oceanography
An Improved Device for Gasometric Determination of Carbonate in Sediment,
J. C. Schink, J. H. Stockwell, and R. A. Ellis. 28 Mar 78, 4p
Contract N00014-75-C-0537, Grant NSF-OCE75-21275
Sponsored in part by Grant NSF-OCE77-21009.
Availability: Paper of unidentified Jnl., U.S., n.d. p651-653 (No copies furnished by DDC).

No abstract available.

AD-A074 132/2 PC **A02**/MF **A01**
Columbia Univ Dobbs Ferry NY Hudson Labs
Standard Calibration of Velocimeters,
M. A. Ransone. 5 Feb 63, 8p Rept no. SER-759-MR
Contract Nonr-266(84)

This note is to outline the procedure involved in producing stabilized baths for velocimeter standard calibration. The basic problem is to bathe the transducers of the velocimeter in an isothermal body of distilled water at various temperatures. This may be done by a series of heat exchanges which will tend to damp out temperature fluctuations. A single hot plate will supply the heat needed to reach the various temperatures desired.

AD-A074 244/5 PC **A03**/MF **A01**
Dayton Univ OH
Feasibility of Utilizing Laser Doppler Velocimeter Techniques in Very Clean Wind Tunnels.
Final rept. Oct 77-Oct 78,
James D. Trolinger, Anthony E. Smart, and Virgil A. Cline. Aug 79, 26p AFFDL-TR-79-3084
Contract F33615-76-C-3145
Prepared in cooperation with Spectron Development Labs., Inc., Costa Mesa, CA.

A laser Doppler velocimeter was tested in a two-foot transonic wind tunnel under clean flow conditions without artificial seeding. Both the classical and photon correlation modes were tested. Both systems worked initially; however, as the tunnel cleaned up during operation, the classical system ceased producing data within a few minutes of run time and the photon correlation mode ceased function after about twenty minutes. The next step in developing a working system is described. (Author)

AD-A074 262/7 PC **A03**/MF **A01**
Dayton Univ OH Research Inst
Tri-Service Thermal Flash Test Facility.
Final rept. 6 Aug 76-31 Oct 78,
Ronald A. Servais, Nicholas J. Olson, and Benjamin H. Wilt. 30 Nov 78, 42p UDRI-TR-78-116, DNA-4757F, AD-E300 577
Contract DNA001-76-C-0339
See also Rept. no. UDRI-TR-77-28 and Rept. no. UDR-TR-77-72, AD-A056 321.

No abstract available.

AD-A074 366/6 PC **A04**/MF **A01**
Naval Surface Weapons Center Dahlgren Lab VA
Capacitor Gauge for Gas Gun Experiments.
Final Rept.,
E. J. Shuler, W. Mock, Jr., and W. H. Holt. Jun 79, 53p Rept no. NSWC/TR-79-192

This report describes the fabrication, calibration, and operation of a capacitor gauge that has been

designed for use with the NSWC gas gun. The gauge was adapted from a Lawrence Livermore Laboratory capacitor gauge. A capacitor gauge measures the shock-induced motion of the free surface of a material specimen. The read time for the gauge is about 1 microsec when used with this gas gun. (Author)

CONF-790505-14 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Limitations of Thermocouples in Temperature Measurements.
R. L. Anderson, R. K. Adams, and B. C. Duggins. 1979, 33p
Contract W-7405-ENG-26
25. ISA international instrumentation symposium, Anaheim, CA, USA, 7 May 1979.

Factors limiting the accuracy of temperature measurements with type K and type S sheathed thermocouple assemblies are discussed. The effect of short-range ordering in Chromel is shown to limit the accuracy of temperature measurements made with type K thermocouple to about 1%. Errors of as much as 150% have been observed in type K thermocouples in magnetic fields at temperatures below the Curie temperature of Alumel. Both positive and negative errors were observed when the orientations of the applied magnetic field, the temperature gradient and the axis of the Alumel wire were such as to produce an emf along the thermocouple wire due to the Nernst--Ettingshausen effect. (ERA citation 04:049083)

CONF-790658-4 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Quantitative SIMS Analysis of Decalibrated Chromel Versus Alumel Thermocouples Using Indexed Sensitivity Factors.
W. H. Christie, R. E. Eby, and T. G. Kollie. 1979, 2p
Contract W-7405-ENG-26
27. annual conference on mass spectrometry and allied topics, Seattle, WA, USA, 3 Jun 1979.

Secondary ion mass spectrometry (SIMS) is used to determine the failure mode responsible for the large decalibrations observed in sheathed, MgO-insulated Chromel versus Alumel, compacted thermocouple assemblies, exposed to temperatures above 1100 exp 0 C. Thermocouples sheathed in Inconel-600 and type 304 stainless steel were studied in this work. Quantified SIMS data showed that the observed decalibrations were due to significant alterations that took place in the Chromel and Alumel thermoelements. The amount of alteration was different for each thermocouple and was influenced by the particular sheath material used in the thermocouple construction. (ERA citation 04:049084)

IS-M-211 PC **A02**/MF **A01**
Ames Lab., IA.
Surface-Crack Characterization by Use of Dynamic Photoelastic Spectroscopy.
L. W. Zachary, C. P. Burger, L. W. Schmerr, and A. Singh. 1979, 19p CONF-790503-2
Contract W-7405-ENG-82
Spring meeting of society for experimental stress analysis, San Francisco, CA, USA, 20 May 1979.

Ultrasonic surface waves (Rayleigh waves) have their energy confined to a small region near the boundary on which they propagate. In many testing situations these waves can be used as a nondestructive evaluation (NDE) tool to effectively locate surface or near-surface flaws. There has been very little work done, however, on actually using these surface waves to characterize the important physical parameters of flaws. This is primarily because amplitude measurements have been traditionally used in NDE to estimate the importance of a flaw and these measurements give unreliable results when the flaw is at or near a surface. Much of the difficulty stems from the fact that when a Rayleigh wave interacts with a surface flaw, a very complicated set of secondary reflected and transmitted waves are produced. These waves often overlap and interfere with one another and develop a total pattern that is extremely difficult to interpret. To quantitatively characterize surface flaws using Rayleigh waves, therefore, it is necessary to use more than amplitude information and to evaluate which secondary waves are most important. The primary purpose of the paper is to demonstrate that a combination of dynamic photoelasticity and spectroscopic techniques offers a promising means of accomplishing both of these tasks. (ERA citation 04:050453)

LA-UR-79-1251 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Philosophy of a Computer-Automated Counting System.
D. G. Perry, and G. C. Giesler. 1979, 6p CONF-790549-3
Contract W-7405-ENG-36
Conference on computerized data - acquisition systems in particle and nuclear physics, Santa Fe, NM, USA, 14 May 1979.

The LAMPF Nuclear Chemistry computer system is designed to provide both real-time control of data acquisition and facilities for data processing for a large variety of users. It is a PDP-11/34 connected to a parallel CAMAC branch highway as well as a large variety of peripherals. The philosophy for the design of this system is discussed; such points as use of the computer for control only versus direct data acquisition by the computer, why a CAMAC system was chosen, and the advantages and disadvantages of this system are covered. Also discussed are future expansion of the system and what might be done differently if the system were redesigned. 3 figures. (ERA citation 04:050542)

MLM-2602(OP) PC **A02**/MF **A01**
Mound Facility, Miamisburg, OH.
Simplified HT--HTO in Air Measurement System.
C. T. Bishop, D. C. Carter, B. M. Farmer, T. B. Rhinehammer, and W. E. Sheehan. 1979, 4p CONF-790602-67
Contract EY-76-C-04-0053
ANS annual meeting, Atlanta, GA, USA, 3 Jun 1979.

A system was developed to measure both elemental tritium and tritium oxide in air at Mound. This system employs a hot Pd oxidation catalyst and ethylene glycol water vapor traps; scintillation solution is added to the latter. (ERA citation 04:048959)

MLM-2624 PC **A02**/MF **A01**
Mound Facility, Miamisburg, OH.
Assessment of a New Hydrogen Isotope Gas Chromatograph.
D. K. Warner. 26 Jul 79, 10p
Contract EY-76-C-04-0053

The analytical precision of a gas chromatograph designed to measure hydrogen isotopes and chemical impurities was determined. Error ranged from 0.9% to 3.5% at the 1 sigma level for the eight measured nonradioactive species. (ERA citation 04:050543)

N79-31229/4 PC **A10**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.v., Goettingen (Germany, F.R.).
Contributions to Experimental Fluid Mechanics Beitrage Zur Experimentellen Stromungsmechanik.
1977, 216p
Language in German.

Various aspects of the reconstruction of aerodynamics testing facilities in West Germany following World War 2 are described in this festschrift honoring Dr. Hubert Ludwieg. His contributions in the development of the high-speed wind tunnel, the 1m x 1m wind tunnel, and the transonic turbine nozzle are stressed. Experiments in spiral flow stability and the application of heated surface elements (films) to measure shear stress on the wall in the three dimensional boundary layer are also discussed. A biography of the scientist and a list of his scientific publications is included.

N79-31230/2 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Wind Tunnels with Adapted Walls for Reducing Wall Interference.
U. Ganzer. Aug 79, 14p NASA-TM-75501
Contract NASW-3199

Tran-Transl. Into English of Z. Fur Flugwissenchaften und Weltraumforschung (Germany, F.R.), V 3, No. 2, 1979 p 129-133. Subm-Transl. By Kanner (Leo) Associates, Redwood City, Calif. Original DOC. Prep. By AERO-Space Inst. Of Berlin (Germany, F.R.).

The basic principle of adaptable wind tunnel walls is explained. First results of an investigation carried out at the Aero-Space Institute of Berlin Technical University are presented for two dimensional flexible walls and a NACA 0012 airfoil. With five examples exhibiting very different flow conditions it is demonstrated that it is possible to reduce wall interference and to avoid blockage at transonic speeds by wall adaptation.

N79-31440/7 PC **A12**/MF **A01**
Societe Nationale Industrielle Aerospatiale, Cannes (France). Div. Systemes Balistiques et Spatiaux.
A Liquid Helium 2 Cryostat for Space Utilization.
Final Report.
26 Feb 79, 268p REPT-959-A-CA/44, ESA-CR(P)-1216
Subm-Sponsored by ESA. Misc- Original Contains Color Illustrations. Partly in French and English.

A program for the development of a liquid helium 2 cryostat suitable for use in a variety of spaceborne experiments and capable of withstanding the rigors of launch and recovery is presented. Several different designs are examined, their pros and cons listed, and a detailed description of the basic configuration chosen is given. The final design has the advantages of employing already existing technologies, of being easily reusable, and of being well adapted to user requirements as it can be integrated with various instruments (superconductor magnets, supercooled telescopes, etc.). Fabrication specifications are discussed in detail, including descriptions of auxiliary hardware (tanks, supports, valves, tubing).

N79-31511/5 PC **A07**/MF **A01**
Societe Europeene de Propulsion, Vernon (France). Dept. Espace.
Investigations of Surface Potential Measurements.
Final Report.
10 Jul 78, 139p ESA-CR(P)-1189
Contract ESTEC-3420/77-NL-MP

Surface electrostatic voltage measurements onboard satellites can be made using various types of detectors. Mechanical, electro-optical, and semiconductor detectors were studied. Detectors examined include a rotating arm detector, an oscillating arm detector, a vibrating capacitor, an electron beam deviation dectector, a Pockel effect detector, and an Insulated gate field effect transistor (IGFET). Three types of detectors (vibrating capacitor, Pockel effect, and (IGFET) were selected. This last type is divided into two subtypes, an IGFET acting as a capacitive voltage divider and a thick gate IGFET. Tests show that the IGFET can be easily destroyed by voltages as low as 1500 V and that it is subject to thermal drift as well as drift under constant voltage. The Pockel effect detector also shows performance deficiencies. Of the three detector types investigated the vibrating capacitor was retained for development as the feasibility of using existing flight hardware was shown. It is suggested that a second generation of IGFET's and Pockel effect detectors also be developed in parallel.

N79-31585/9 PC **A04**/MF **A01**
Sira Inst. Ltd., Chislehurst (England).
Measurement of Emittance at Cryogenic Temperatures, Phase 1 Report.
W. A. Henton-jones, L. J. Cox, and A. Gilkes. Jan 79, 67p SIRA-6/5187/00-0, ESA-CR(P)-1198
Contract ESTEC-3567/78-NL-HI

The initial studies for a program aimed at producing apparatus for the measurement of emittance of materials at cryogenic temperatures is presented. A detailed definition of the system elements and of the optical system, the test and calibration plan, and a target performance specification are included. The reasons for choosing the radiometric method are explained. A total hemispherical emittance mode of operation is adopted, although a

scheme for measuring directional emittance at some future date is provided for in the cryostat construction.

N79-31603/0 PC **A08**/MF **A01**
Mechanical Technology, Inc., Latham, NY.
Design and Application of a Test Rig for Super-Critical Power Transmission Shafts.
Final Report.
M. Darlow, and A. Smalley. Aug 79, 168p NASA-CR-3155, MTI-78TR41
Contract NAS3-16824

The design, assembly, operational check-out and application of a test facility for testing supercritical power transmission shafts under realistic conditions of size, speed and torque are described. Alternative balancing methods and alternative damping mechanisms are demonstrated and compared. The influence of torque upon the unbalance distribution is studied, and its effect on synchronous vibrations is investigated. The feasibility of operating supercritical power transmission shafting is demonstrated, but the need for careful control, by balancing and damping, of synchronous and non-synchronous vibrations is made clear. The facility was demonstrated to be valuable for shaft system development programs and studies for both advanced and current-production hardware.

N79-31736/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Remote Sensing.
A. Jinich. Aug 79, 25p NASA-TM-75651
Contract NASW-3198
Tran-Transl. Into English from Ciencia Y Desarrollo (Mexico), No. 26, May/Jun. 1979 p 33-41, 45. Subm-Transl. By Scientific Translation Service, Santa Barbara, Calif.

Various imaging techniques are outlined for use in mapping, land use, and land management in Mexico. Among the techniques discussed are pattern recognition and photographic processing. The utilization of information from remote sensing devices on satellites are studied. Multispectral band scanners are examined and software, hardware, and other program requirements are surveyed.

PATENT-4 121 467 Not available NTIS
Department of the Army Washington DC
Non-Destructive Technique for Surface Wave Velocity Measurement.
Patent,
Grant R. Gerhart. Filed 31 May 77, patented 24 Oct 78, 7p AD-D006 328/9, PAT-APPL-801 508
Supersedes PAT-APPL-801 508-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

It is often desirable to measure absolute and relative USW velocities in a specimen. One example is a specimen which is to be tested for residual surface stresses. The specimen is provided with two scratches which are parallel and a known distance apart. An ultrasonic surface wave (USW) transducer is attached to the surface of the specimen in such a way as to efficiently transfer USW energy to the specimen. During testing, the incident pulse from the transducer is partially reflected at each scratch. The same transducer generates and detects both reflections. The transducer output goes through a clipping circuit which clips the large incident voltage spikes in the output and passes the smaller, echo voltages through to an oscilloscope. The oscilloscope horizontal sweep is driven at a frequency which is the reciprocal of the difference in arrival times between the two reflected pulses. A dual pulse delay generator is detailed as a double strobe delay generator having a plurality (herein six) of integrated circuits (IC's) interconnected as described below to provide the Z-axis input to the oscilloscope.

PATENT-4 132 928 Not available NTIS
Department of the Army Washington DC
Device for Identifying Waveforms in a Multiple Oscilloscope Display.
Patent,
Howard M. Berlin. Filed 28 Apr 77, patented 2 Jan 79, 4p AD-D006 337/0, PAT-APPL-791 754
Supersedes PAT-APPL-791 754-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a new device for rapid identification of two or more analog signals simultaneously displayed upon an oscilloscope. (Author)

PATENT-4 146 987 Not available NTIS
Department of the Army Washington DC
Impulse Activated Counting Device.
Patent,
Colin M. Hudson, and William L. Andre. Filed 1 Nov 76, patented 3 Apr 79, 4p AD-D006 345/3, PAT-APPL-737 867
Supersedes PAT-APPL-737 867-76.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a method and apparatus for actuating a counting device for recording and storing data. The invention comprises an activator for a counter device and includes a mass or weight having an eccentric center of mass which is freely pivotable in one plane in response to an externally applied impulse force of a predetermined magnitude to apply a torque force to a shaft which, on rotation thereof under the influence of said torque force, activates the counter mechanism to record a count. Means are also provided to apply counter torque force of a constant predetermined magnitude or value to the shaft so that the counting device is actuated only in respone to a resultant torque force of a predetermined magnitude or value generated by the impulse. (Author)

PATENT-4 154 092 Not available NTIS
Department of the Army Washington DC
Pneumatic Gross Leak Detector.
Patent,
James W. White, and Victor W. Ruwe. Filed 4 May 78, patented 15 May 79, 5p AD-D006 371/9, PAT-APPL-902 595
Supersedes PAT-APPL-902 595-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A pneumatic gross leak detector is described for testing micro-electronic packages. The apparatus includes a frame having a vertically movable upper section and a stationary lower section. A chamber is provided with walls which are secured to the upper section for movement therewith. The chamber includes upper, lower and intermediate portions disposed in communication. A test chamber base is secured to the lower stationary section to receive the microelectronic package therein. A first piston is provided in the upper chamber portion for moving the upper frame section downwardly for sealing engagement for the lower chamber portion with the test chamber base. A second piston is provided for compressing air in the lower chamber portion to a predetermined value. A readout device communicates into the test chamber to indicate if compressed air in the lower chamber leaks into the micro-electronic package. (Author)

SAND-78-1803 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Development of Laboratory Apparatus Dedicated to the Study of Hydride--Dehydride Reactions.
R. P. Wemple, and W. J. Kass. Jul 79, 30p
Contract EY-76-C-04-0789

Hydrogen-compatible laboratory apparatus has been designed and developed to study hydride--dehydride :eactions at elevated pressures and temperatures. The system has operated at pressures and temperatures up to 34 MPa and 550 exp 0 C during experiments conducted on LiAlH sub 4 and NiZr. Instrumentation incorporated into the system also allows differential thermal analysis and acoustic emission data to be collected as the chemical reactions progress. 13 figures. (ERA citation 04:050341)

SAND-78-1836 PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
QUANT: A Quantitative Analysis Schedule for Tracor Northern Automated Electron Microprobes.
W. F. Chambers, and J. H. Doyle. Jul 79, 25p
Contract EY-76-C-04-0789

QUANT is a special schedule for electron microprobes which are automated with Tracor Northern electronics. QUANT is called from the SANDIA TASK-78 control program and provides simultaneous data acquisition and data reduction capabilities using either a first principles atomic number, absorption, fluorescence (ZAF) technique or a matrix correction (Bence--Albee) technique. During operation, QUANT controls the execution of three auxiliary programs - BA78, ZAF78, and SETUP. (ERA citation 04:050544)

UCRL-15034 PC **A03**/MF **A01**
Washington State Univ., Pullman. Dept. of Mechanical Engineering.
Analysis of a Flow Metering Device for Low-Quality Steam-Water Flows. Final Report.
C. T. Crowe. 1976, 42p
Contract W-7405-ENG-48

The goal of this project is to investigate the potential of the meter configuration consisting of a sharp-edged contraction section followed by an extended length of constant area duct and finally a diffuser section for pressure recovery. This and two other configurations were tested. These configurations and the reasons underlying their selection are described and discussed. It is concluded that Murdock's correlation for steam/water flow through orifices and sudden contraction sections at low qualities is invalid and the metering scheme based on it is inoperative. (ERA citation 04:048502)

UCRL-82276(Rev.1) PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Leak Testing Requirements at a Research Facility.
J. B. Conner. 30 Apr 79, 9p CONF-790612-2
Contract W-7405-ENG-48
Vacuum technology conference, Boston, MA, USA, 5 Jun 1979.

Since September, 1952, Lawrence Livermore Laboratory has conducted pioneering research in applied science. A vital part of this activity has been the development of a variety of high vacuum and ultrahigh vacuum systems. Leaks occur in everything, including vacuum systems. The mass spectrometer leak detection equipment is described. (ERA citation 04:050547)

UCRL-82468 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Calibration Techniques.
G. O. Nelson. 1 May 79, 20p CONF-790832-1
Contract W-7405-ENG-48
Biennial Boulder symposium, Boulder, CO, USA, 6 Aug 1979.

Preparing known concentrations of gas and vapor in air is an important function in any industrial hygiene laboratory. Two systems for generating gas or vapor mixtures are compared: the simple static system and the more complex dynamic system. A completely automated dynamic system that controls the flow, temperature, humidity, and concentration of a gas or vapor mixture is also described. (ERA citation 04:048983)

14D. Reliability

AD-A073 833/6 PC **A06**/MF **A01**
Systems Consultants Inc Ridgecrest CA
217B PREDICT, System Reliability Prediction Computer Program. Volume I. User Manual.
Mar 77, 116p GIDEP-E071-0295, GIDEP-195.20.00.00-X7-01
Contracts N00123-73-C-0243, N00123-76-C-0340
Also available as NWC-REG-3686-127-77-Vol-1.

No abstract available.

AD-A073 895/5 PC **A03**/MF **A01**
Missouri Univ-Columbia Dept of Statistics

A Maximum Likelihood Estimator for an Exponential Parameter from a Life Test with Both Type I and Type II Censoring.
Technical rept.,
Kenneth B. Fairbanks. Aug 79, 36p Rept no. TR-86
Contract N00014-76-C-0789

A hybrid life test on items assumed to have an exponential lifetime combines type I and type II censoring. In type I censoring, n items are placed on test and observed for a fixed time t*, while in type II censoring the test terminates with the rth sub 0 failure, where r sub 0 is a preassigned integer. If t sub r sub 0 is the time of the rth sub 0 failure, a hybrid life test terminates at min(t sub r sub 0, t*). In some situations it may be of interest to estimate the average lifetime theta, following the test decision. In this report, we find the maximum likelihood estimator, theta-cap, when the sample is subject to hybrid censoring. An expression for E(theta-cap) is derived. Because this expression is complex, computer simulations are used to examine the bias of theta-cap. (Author)

AD-A073 896/3 PC **A03**/MF **A01**
Missouri Univ-Columbia Dept of Statistics
Confidence Intervals for an Exponential Parameter from a Two Stage Life Test.
Technical rept.,
Kenneth B. Fairbanks. Aug 79, 34p Rept no. TR-87
Contract N00014-76-C-0789

The two stage life test of Bulgren and Hewett (1973) for the mean lifetime, theta, of an exponentially distributed lifetime is essentially a two stage version of type 2 censoring. Since the test decision only determines whether theta is above or below theta sub 0, it may be of interest to estimate theta following the decision using the test data. Epstein (1960a) found confidence intervals for under type 2 censoring. This report shows that Epstein's intervals may be modified slightly and used to provide confidence intervals for theta following the two stage test. The resulting confidence intervals are shown to be conservative. (Author)

AD-A073 897/1 PC **A03**/MF **A01**
Missouri Univ-Columbia Dept of Statistics
Approximate Confidence Intervals for an Exponential Parameter from a Sequential Life Test.
Technical rept.,
Kenneth B. Fairbanks. Aug 79, 37p Rept no. TR-88
Contract N00014-76-C-0789

A sequential life test for the exponential location parameter was given by Epstein and Sobel (1955). This sequential test may be modified by truncating the test at r sub 0 failures and/or at total test time t'. There may be a need or a desire to also estimate the parameter after the test decision, using the test data. Bryant and Schmee (1979) have given confidence intervals for the mean lifetime, theta, from a truncated sequential test scheme, using methods which depend heavily on numerical techniques using a computer. A more flexible approach is considered using a martingale inequality which was also given by Wald (1947) in another context. Interval estimates are found which are functions of a positive constant d which must be chosen less than an upper bound which is itself a function of the number of failures observed. It is suggested that d be chosen as a function of the sample path (i.e., after the test is complete). The validity of the confidence coefficient comes into question if this posterior selection of d is employed. Simulation studies indicate that the resulting intervals are usually conservative.

14E. Reprography

AD-AC74 294/0 PC **A02**/MF **A01**
Army Electronics Labs Fort Monmouth NJ
Evaluation of Viewer 3 1/4 Inch X4 Inch and 70mm Strip.
L. D. Goldfarb, and George Gordon. 2 May 60, 12p Rept no. USASRDL-TEST-1480

The viewer, a portable optical device operating from 115 VAC, is designed to produce an enlarged illuminated image on a viewing screen. Either 3 1/4 by 4 in. slides or 70mm strip transparencies can be used with the viewer. Tests performed on the viewer are discussed. In general the viewer was found to be in accordance with the technical requirements. (Author)

PATENT-3 149 776 Not available NTIS
Department of the Army Washington DC
Portable Microfiche Reading Instrument.
Patent,
Seth L. Everett, Jr. Filed 24 Apr 78, patented 17 Apr 79, 7p AD-D006 356/0, PAT-APPL-898 738 Supersedes PAT-APPL-898 738-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A relatively compact, inexpensive, and portable viewer for reading photographic reductions, such as microfiche film cards, includes a cylindrical translucent diffuser tube which provides for entry of sufficient light under usual ambient conditions for viewing the film; a transparent cylindrical mounting tube axially centered within the diffuser tube; and a slide tube axially and longitudinally movable, by hand operation, within the transparent mounting tube. The slide tube forms an optical path comprising a rectangular opening in its wall near one of its ends which acts as a film gate, a reflecting mirror positioned in line with the wall opening, a magnification lens, and an eyepiece lens. The film is inserted in the cylindrical gap formed between the diffuser tube and the mounting tube and the slide tube is moved so that the desired portion of the film may be viewed, enlarged, and read. (Author)

PATENT-4 149 781 Not available NTIS
Department of the Army Washington DC
Sealed, Super 8, Optical Sound, Projection Means.
Patent,
Seth L. Everett, Jr. Filed 24 Feb 76, patented 17 Apr 79, 13p AD-D006 357/8, PAT-APPL-660 734 Supersedes PAT-APPL-660 734-76.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a film projector system including a sealed film cassette removeably mounted within an aperture in the projector and driving means in said projector mechanically engaging coupling means extending through said cassette for driving the sealed film between hubs sealed in said cassette intermittently past a film projection location in said cassette and continuously past a sound detection location therein, with the projection plane of the film at said projector locations being disposed normal to the projector optical projection optical sound beams and twisted ninety degrees with respect to the plane of that portion of the film wound on said hubs so that the projector beams do not pass between the film hubs.

15. MILITARY SCIENCES

15B. Chemical, Biological, and Radiological Warfare

AD-A074 311/2 PC **A03**/MF **A01**
Midwest Research Inst Kansas City MO
Feasibility Studies on Enzyme Systems for Detector Kits.
Quarterly progress rept. no. 11, 28 Dec 78-28 Mar 79,
Louis H. Goodson, and Donald R. Sellers. Jun 79, 26p ARCSL-CR-79051, AD-E410 175
Contract DAAA15-76-C-0132

Six alternate buffers have been used in place of PIPPS for preparation of cholinesterase impregnated test discs in an attempt to increase disc sensitivity to inhibition by GB and VX. With some buffers greater sensitivities were obtained at 0.05 M than at 0.5 M. TES buffer is still being considered as a possible replacement for PIPPS in our enzyme tickets. A novel three-disc test system employing an enzyme disc, a substrate disc, and a color reagent disc has been successful during preliminary tests. (Author)

15C. Defense

AD-A074 229/6 PC **A04**/MF **A01**
Tecolote Research Inc Santa Barbara CA
The Relationship between Development and Production Hardware Costs in Military Weapons System.
Final technical rept.,
W. E. Waller, T. J. Dwyer, A. J. Kluge, and R. R. Liebermann. Sep 76, 65p Rept no. TM-47

This study was designed to establish the validity and nature of a relationship between the cost of producing prototype units and the cost of producing the units in the investment phase where only costs recurring with the units was considered. A secondary objective of this analysis involved the assessment of the most appropriate cost improvement theory to employ in developing the theoretical first unit cost of an item. (Author)

AD-A074 377/3 PC **A03**/MF **A01**
Connecticut Univ Storrs Dept of Electrical Engineering and Computer Science
Resource Allocation with Decentralized Information in Ballistic Missile Defense.
Final rept. 19 Jul 78-18 Jul 79,
Yaakov Bar-Shalom. 13 Aug 79, 48p
Contract DASG60-78-C-0109

This report deals with the way a network of decision makers can control an outside environment. The environment considered is the Ballistic Missile Defense where defense resources are to be allocated. The allocation problem is one of interceptors against an attack. The network of decision makers is described by an arbitrary connection matrix. A decentralized information pattern is considered: each decision maker is a node in the network and has access only to the information of the nodes it is connected to. A decision consists of the allocation of its defense resources to own defense and to support the neighbors. In the dynamic case part of the available resources have to be put aside for future use. The future attack against which these resources will have to be used is known only via a probabilistic description. All these decisions have to be made using the decentralized information available to each decision maker. The framework of solution for this problem is within what is known as team theory. Three decentralized allocations are proposed and compared via simulations with a local strategy (no exchange of information) and the fully centralized strategy. The results show that the most sophisticated decentralized strategy can achieve a performance near the one of the centralized. The implications of these results on the design of a computer network to carry out these functions are also discussed. (Author)

PAT-APPL-6-052 178 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Intruder Detector System Having Improved Uniformity of Detection Sensitivity.
Patent Application,
J. Leon Poirier. Filed 25 Jun 79, 19p AD-D006 312/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Uniform detection sensitivity along the periphery of an r.f. loop intruder detector system is realized by periodically electronically interchanging the input and termination ends of the system's leaky transmission line transmitting element. The intruder detector system comprises a length of leaky transmission line that encompasses the region to be protected, a receiving antenna within the protected region, an r.f. transmitter and a remotely located receiver and detector. R.F. energy is transmitted through the leaky transmission line and received by the receiving antenna and detector means to establish a normally quiescent field. Violation of the protected region by crossing the leaky transmission line disturbs the quiescent field condition and the intrusion event and the location is signaled by the detector. The effects of attenuation along the leaky transmission line are obviated by periodically switching the transmitter to alternate leaky tranmission line ends.

PATENT-4 108 191 Not available NTIS
Department of the Army Washington DC

Fan Mesh Disrupter.
Patent,
Arthur T. Merriam. Filed 17 Sep 75, patented 22 Aug 78, 4p AD-D006 323/0, PAT-APPL-614 389 Supersedes PAT-APPL-614 389-75.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses an expandable-retractable fan mesh disrupter for camouflaging the shape of the item it is attached to. The disrupter is fabricated of materials and attachments to facilitate rapid emplacement and displacement. In their emplaced expanded condition they confuse potential air and ground observers as to the identity of the objects. (Author)

PB80-104912 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Logistics and Communications Div.
Modernizing the Air Reserve Forces - More Emphasis on Logistics Support Needed.
Report to the Congress.
6 Nov 79, 42p LCD-80-11

The Air Force needs to examine more closely the logistics support impact of modernizing its Air Reserve Forces. Substantial savings and increased effectiveness can be achieved by using alternative basing and support structure and by making the Air Reserve Forces more like the Active Air Force. The Secretary of the Air Force should reconsider present modernization plans with emphasis on reducing support requirements. Integrated logistics support planning should be used to determine the logistical impact of transferring aircraft to the Air Reserve Forces.

15E. Logistics

AD-A073 889/8 PC **A04**/MF **A01**
Naval Postgraduate School Monterey CA
A Dynamic Ammunition and Fuel Resupply Module in Support of the STAR Model.
Master's thesis,
Bruce Gordon Ripley. Jun 79, 66p

This thesis presents the structure of an ammunition and fuel resupply system for use with a detailed computer combat simulation. The logistics system is developed for a brigade-sized unit. Current logistics doctrine is addressed as background and is used as a basis for the module development. The parameters described for ammunition and fuel permit one to follow individual vehicle loads on the battlefield. General terms are used to describe vehicles and loads so that current or proposed systems may be used. A manual simulation provides an example of the use of the module and the analysis one may do with it. A brief description of the combat model which will use the logistics module is included. STAR stands for Simulation of Tactical Alternative Responses. (Author)

AD-A073 926/8 PC **A06**/MF **A01**
Naval Postgraduate School Monterey CA
An Analysis of the Role of Transportation in the U.S. Coast Guard Physical Distribution System.
Master's thesis,
John Anthony Wcislo. Jun 79, 114p

The purpose of this study was to analyze how the United States Coast Guard utilizes transportation to effect the physical distribution of goods. The study examined the existing organizational, managerial, and financial structures of transportation and physical distribution within the Service, as well as the transportation management activities that occurred at the working level. The focus of this working level examination was the traffic management organization at two of the Coast Guard's supply centers: the U.S. Coast Guard Supply Center, Brooklyn, New York, and the U.S. Coast Guard Aircraft Repair and Supply Center, Elizabeth City, North Carolina. From analysis of the available information, it appeared that concerted efforts were being made at the working level to manage transportation effectively. The recommendations contained in this study have emphasized a realignment of authority and accountability for transportation management, in order to effect a greater integration of these working level efforts into the physical distribution system of the Coast Guard. (Author)

AD-A074 001/9 PC **A04**/MF **A01**
Army Tropic Test Center APO Miami 34004
Methodology Investigation Exposure/Performance Tests of Selected Materiel Items.
Final rept. Jul 73-Apr 75,
George F. Downs, and Robert J. Gorak. Jan 79, 73p Rept no. USATTC-790102

USATTC conducted a methodology investigation in the Canal Zone from July 1973 to April 1975 to study the relationships among performance of materiel, exposure, and materials deterioration. Representative items of Army materiel were selected, exposed in different modes in the humid tropics, and performance tested at regular intervals. Objectives were to learn how and when to measure performance, to relate the performance measures to materiel deterioration, and to learn how and when to apply nondestructive test (NDT) techniques. The pallet and tarpaulin-forest storage mode provided the most severe environment. Use of this storage mode in tropic surveillance tests will uncover materiel design weaknesses more rapidly than other common long-term storage modes. In general, exterior visible evidence of material degradation should not be used for item performance predictions. Test items exposed in the humid tropics should be performance tested and fully disassembled and examined to determine the full extent of tropic deterioration. Further studies are required to investigate techniques for quantifying the severity of microbial attack and distinguishing between destructive and nondestructive growth. Meaningful application of NDT techniques to test items during tropic surveillance testing requires further refinement. An investigation should be undertaken to examine state-of-the-art NDT techniques for application to tropic testing. (Author)

AD-A074 194/2 PC **A07**/MF **A01**
Army Infantry School Fort Benning GA
Logistics Handbook.
First Edition FY 69.
1969, 148p

This handbook sets forth the principles and policies governing supply and property accounting procedures as they relate to requesting, receiving, and accounting for supplies at the battalion level. The battalion S4 is the key individual in the battalion supply system, for he is the link between the user (the individual soldier) and the source (the division support command). Supply and property accounting in its simplest form is a major logistical function. The current supply system is founded on the basic principle that each unit should have the supplies/equipment necessary to accomplish its mission. The type and quantity of supplies authorized (What You Are Authorized) are stated in tables of organization and equipment, tables of allowance, supply manuals, Army regulations, and by special authorizations. The supplies listed in the organization property book(s) as being on hand (What You Actually Have) may differ from what you are authorized. The difference between what you are authorized and what you do not actually have constitutes a shortage(s) (What You Are Short). To obtain what you are short or what you need (How to Get What You Need), you must anticipate requirements and request the supplies; requests must include the authorization or basis for the supplies. Allied to the requirement to determine what you are authorized, what you actually have on hand, what you are short, and the action to obtain what you need, is the requirement to maintain, store, secure, and conserve the supplies and property you have on hand (How to Keep What You Have).

AD-A074 259/3 PC **A02**/MF **A01**
Pittsburgh Univ PA Dept of Industrial Engineering
Scientific Management of the Repairable Item Inventory System.
Final rept.,
Steven Nahmias. 28 Aug 79, 5p AFOSR-TR-79-0982
Grant AFOSR-78-3494

The purpose of this research was to examine a number of existing mathematical models of repairable inventory systems in order to discover possible improvements and/or generalization of existing work in this area of research. The research resulted in two research reports. One deals with a deterministic model for a repairable item inventory system with a finite repair rate. The second report deals with managing repairable item inventory systems. The second paper presents a relatively comprehensive review of the mathematical models which have appeared in the literature for managing inventory systems where items were subject to repair. It deals with both the continuous review models - METRIC and its extensions - and periodic review models which are based on dynamic programming formulations.

AD-A074 297/3 PC **A07**/MF **A01**
Little (Arthur D) Inc Cambridge MA
Systems Analysis of Methods for Installing Fuel Transport Systems.
Final rept. 1 Jan-30 Jun 79,
Donald B. Rosenfield, Robert H. Bode, Herbert H. Loeffler, and W. Scott Nainis. 30 Jun 79, 145p Rept no. ADL-80260-19
Contract DAAK70-77-D-0024

A systems analysis was performed to evaluate different types of rapid pipeline construction systems and other methods for installing fuel transport systems. The present manual construction methods do not meet the U.S. Army goals of laying 30 kilometers per 20 hour day. The systems analysis consisted of two phases of evaluating and scoring system attributes for numerous proposed systems. Five systems were considered for the second phase analysis, and two of these merit consideration for future development. These consist of a mechanized pipelaying machine using sectioned pipes with a joint to be designed and a system of collapsible, medium pressure hose. The hose involves more development and does not score as highly in performance and reliability. However, the hose is less expensive and easier to install and therefore merits first consideration. (Author)

AD-A074 319/5 PC **A02**/MF **A01**
Army Inventory Research Office Philadelphia PA
A Simple Model for Assessing the Impact of Spare Parts during Initial Deployment of New Weapons Systems.
Technical rept.,
W. Karl Kruse. Jun 79, 12p Rept no. IRO-TR-79-3

This report presents an alternative to the 90-90 rule for assessing the impact of spare parts support during initial deployment. The method is felt to be an improvement to 90-90 because it considers the relative failure rates of the spares, and because it distinguishes reparable components from repair parts. An effort was made to keep the model simple. (Author)

PATENT-4 153 169 Not available NTIS
Department of the Army Washington DC
Loading-Unloading Capability for Cargo Box Transport Vehicle.
Patent,
Jerome T. Cipkowski. Filed 8 May 78, patented 8 May 79, 6p AD-D006 366/9, PAT-APPL-903 432 Supersedes PAT-APPL-903 432-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Containerized freight is loaded onto a vehicle by attaching an elongated tripod frame to one end of the freight container, applying a lift force to the other end of the container to reposition the container above the plane of the bed on the vehicle, backing the vehicle into the space beneath the container, and lowering the container onto the vehicle bed for transport to another location. (Author)

15F. Nuclear Warfare

AD-A073 849/2 PC **A06**/MF **A01**
Army Scientific Advisory Panel Washington DC
Nuclear Protection for the Soldier.
Final rept.,
Chris J. D. Zarafonetis, Herbert L. Ley, Jr., Donald M. Kerr, Richard L. Wagner, Jr., and William E. Woodward. 27 Jul 79, 123p

The vulnerability of the soldier to the effects of ionizing radiation is well established. The potential threat against the US military forces was reviewed and a variety of means of providing protection against the effects of nuclear radiation on the battlefield were analyzed. The findings, conclusions and recommendations of the Ad Hoc Group are presented for consideration and possible implementation in the future. (Author)

15G. Operations, Strategy, and Tactics

AD-A073 919/3 PC **A03**/MF **A01**
Electronic Systems Div Hanscom AFB MA
An Investigation of Reliability, Maintainability, and Availability in the TACC Automation Program,
John S. Gordon. Mar 79, 36p Rept no. ESD-TR-79-139

This report contains reliability and availability (RMA) information concerning RMA background and principles, RMA complexities encounted by the TACC Automation Program, and methods for enhancing RMA. Basic derivations and formulas are presented for modeling various redundant configurations. TACC Automation RMA complexities are discussed in terms of basic RMA definitions, system definition deficiencies, and RMA predictions. RMA enhancements are addressed in terms of RMA growth and RMA improvement. (Author)

AD-A073 976/3 PC **A05**/MF **A01**
Naval Postgraduate School Monterey CA
Parametric Terrain and Line of Sight Modelling in the STAR Combat Model.
Technical rept.,
James K. Hartman. Aug 79, 88p Rept no. NPS55-79-018
Contract MIPR-CD-1-79

This report presents the motivation and mathematical background for the parametric terrain model used in the STAR(Simulation of Tactical Alternatie Responses) Brigade level combined arms combat simulation. Computer subroutines for terrain elevation and line of sight computations are presented and explained in detail along with several preprocessor utility programs. (Author)

AD-A074 000/1 PC **A06**/MF **A01**
Wyoming Univ Laramie
Military Use by Warsaw Treaty Organization Forces of 20th Century Operational Routes in the Benelux and Northern Germany.
Final rept.,
Clayton Arthur Pratt. Apr 77, 116p

Routes across the plains of northern Germany and the Benelux were used in both 20th Century wars. Four operations of commanders in these wars are analyzed by the author, then compared to 1977 available routes on the same terrain. It is the author's thesis that these northern routes are still viable and the probable avenue of approach for Warsaw Treaty Organization forces to attack into western Europe. A summary is shown of current battlefield mobility capabilities of those forces plus a hypothetical Warsaw Treaty Organization force scenario of such an attack, with the author roleplaying as its commander.

AD-A074 054/8 PC **A08**/MF **A01**
Battelle Columbus Labs OH
Cost-Driver Analysis for Computerized Production Process Planning.
Final rept.,
Terrance E. Hill, Thomas G. Byrer, and Bryan R. Noton. 20 Jul 79, 164p
Contract DAAK40-77-R-0138

This report describes the work done by Battelle's Columbus Laboratories (BCL) for the U.S. Army Missile Research and Development Command (MIRADCOM) to develop a methodology for examining missile manufacturing costs, cost drivers in manufacture, and future missile MANTECH programs from the standpoint of best ROI of funds. This objective has been met through the development of a missile parts classification system (MPCS) which provides a methodology for examining cost drivers in missile manufacture plus a variety of other interactive possibilities achievable through the availabiiity of cost information at the discrete part level. As devised, this methodology will accommodate both present as well as future missile systems. In other words, the methodology is designed such that as new technologies develop, the system is sufficiently flexible to accommodate these changes. Data would be stored and retrieved from a computer to allow general comparisons of costs which will identify cost drivers, MANTECH projects with high ROI, and estimates of future missile costs.

AD-A074 144/7 PC **A02**/MF **A01**
Army Field Artillery School Fort Sill OK
Winter War: A Periodicals Bibliography.
Final rept.,
Lester L. Miller, Jr. 15 Sep 79, 12p Rept no. SPECIAL BIB-65

This bibliography covers representative periodical articles written on the subject of winter warfare. The materials have been selected from thirty-five periodicals held by the Morris Swett library. (Author)

AD-A074 151/2 PC **A02**/MF **A01**
Research Analysis Corp McLean VA
RAC Publications in Civil Affairs and Civic Action, Psychological Warfare and Counterinsurgency.
20 May 66, 16p

The attached lists of Reports (R), Technical Memoranda (T), Staff Papers (SP), and Technical Papers (TP) were extracted from the 15 March 1966 RAC Publications List. The three attached lists include all published documents of the Research Analysis Corporation and its predecessor. The Operations Research Office (ORO), released prior to 15 March 1966 involving three related fields of military endeavor: Civil Affairs, including Civic Action; Psychological Warfare, now more often described as Psychological Operations; and Counterinsurgency, sometimes described as Unconventional Warfare.

AD-A074 198/3 PC **A02**/MF **A01**
George Washington Univ Alexandria VA Human Resources Research Office
Bibliography: Evasion and Escape -- Survival.
1958, 9p

No abstract available.

AD-A074 296/5 PC **A04**/MF **A01**
Army Infantry School Fort Benning GA
Rifle Squad and Platoon Evaluation Program 22 May - 31 July 1961. Annexes A-I.
23 Oct 61, 66p

The Commandant, USAIS, expressed concern over problems resulting from the introduction of certain new weapons into current organizations; specifically mentioned were: (1) The loss of the multishot capability of the M79 grenade launcher justified the need to examine whether the decision to place two of these weapons in each rifle squad remained a valid one. (2) The demonstrated inaccuracies of the M14 rifle (modified) and its inability to maintain a high rate of fire made it a doubtful substitute for the BAR in satisfying the automatic fire requirements of the Rifle Squad. (3) Substitution of the M60 machinegun for the M14 (modified) rifle in the Rifle Squad should not be accomplished without careful consideration of the tactical and logistical implications involved. The Commandant, USAIS, directed that tactical field testing be conducted at Fort Benning to determine an optimum Rifle Squad and Platoon which provides the best balance of personnel, weapons, equipment, and tactics for the present time frame.

16. MISSILE TECHNOLOGY

16B. Missile Trajectories

AD-A073 901/1 PC **A07**/MF **A01**
Naval Surface Weapons Center White Oak Lab Silver Spring MD
MODIFLY: A Modular Multi-Degree-of-Freedom Trajectory Program.
Final rept.,
John E. Holmes. 1 Mar 79, 130p Rept no. NSWC/WOL/TR 78-59

MODIFLY is a modular trajectory simulation computer program which was written so as to be effective, efficient, and easily modified. The program was designed primarily for the simulation of typical autonomous guided missiles in which roughly equal consideration is given to the simulations of the seekers, guidance, autopilot, controls, and aerodynamics. It was written in FORTRAN IV language for use on a CDC 6500 computer and uses overlay files and a library edit routine. (Author)

16C. Missile Warheads and Fuses

AD-A074 292/4 PC **A04**/MF **A01**
IIT Research Inst Chicago IL
Feasibility of Squeeze Casting the Base for the PATRIOT Warhead XM248E1.
Final rept. 1 May 78-31 Mar 79,
Ambika Chakravartty. 30 Apr 79, 54p Rept no. IITRI-B6151-12
Contract DAAK10-78-C-0176

Squeeze casting is a hybrid of permanent mold casting and forging techniques. In this metalworking process molten metal is metered into a die cavity and pressure is applied to the solidifying metal. Suitable use of the optimized process parameters can eliminate common casting defects such as shrinkage and gas porosity and can lead to improved mechanical properties over those of sand or permanent mold castings. This program was aimed at squeeze casting the base for the PATRIOT warhead XM248E1 from a wrought aluminum alloy (6061 AL). The possible enhancement of properties resulting from the use of this alloy, as well as from the squeeze casting process itself, and the potential for cost reduction were two areas of major interest. This final report describes the equipment and the squeeze casting tooling, procedural details, and the evaluation of the castings, and is a summary of IITRI's results in squeeze casting the PATRIOT warhead base. (Author)

16D. Missiles

AD-A073 973/0 PC **A03**/MF **A01**
Army Missile Research and Development Command Redstone Arsenal AL Technology Lab
High Speed Function Generation for Research and Project Support.
Technical rept.,
Charles L. Lewis, Gary M. Griner, and Larry H. Hazel. Jun 79, 34p Rept no. DRDMI-T-79-66

Since 1972, the US Army Missile Research and Development Command (MIRADCOM) has maintained and operated a real-time hardware-in-the-loop (HWIL) homing missile simulation at Redstone Arsenal, Alabama. Because of the need for a detailed, accurate simulation and to support the US Army Modular Missile research program and other advanced missile research, a decision was made to upgrade the HWIL simulation by adding a special purpose digital processor. The processor selected was the Applied Dynamics, Inc., AD 10. This report described the work performed to program the AD 10 and modify the existing simulation for the Homing and Laser Simulation Facility (HALS). (Author)

AD-A074 284/1 PC **A02**/MF **A01**
Tennessee Univ Space Inst Tullahoma
The Analysis of Wing-Body Combinations at Moderate Angles of Attack,
N. Uchiyama, R. P. Mikkilineni, and J. M. Wu. 1978, 7p ARO-14966.1-A-E
Grant DAAG29-77-G-0108
Presented at the AIAA Aerospace Sciences Meeting (16th), 16-18 Jan 78, Huntsville, AL.

No abstract available.

PAT-APPL-6-035 580 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Missile Hoisting Sling.
Patent Application,
Farley T. Hinds. Filed 3 May 79, 9p AD-D006 302/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The patent application describes a hoisting sling for handling a missile by its mounting lugs wherein the aft lugs include a matched pair of inwardly facing spaced apart angled members fixedly attached to the body of the missile and the forward lug includes an upwardly extending headed pin element. The sling consists of a heavy flat textile tape with a forward slotted grip on one end for engaging the forward headed lug and an angled grip on the other end for sliding engagement with the rearward spaced lugs on the missile so that the missile can be lifted and transported by engagement with a standard fork lift truck. (Author)

17. NAVIGATION, DETECTION, COMMUNICATIONS, AND COUNTERMEASURES

17A. Acoustic Detection

AD-A073 876/5 PC **A02**/MF **A01**
Texas Univ at Austin Applied Research Labs
Summary of Environmental Acoustic Data Analysis.
Final rept. 1 Jul 74-30 Jun 75,
Glen E. Ellis. 14 Aug 79, 15p Rept no. ARL-TR-79-46
Contract N00014-70-A-0166

The areas of work performed were upgrading of data processing systems, processing of environmental acoustic data for the SQUARE DEAL Exercise, acoustic model implementation, and technical support. A feasibility study of SUS multipath processing and analysis was successfully conducted.

AD-A073 903/7 PC **A05**/MF **A01**
Naval Ocean Research and Development Activity NSTL Station MS
Deep-Towed Geophysical Array Development Program Progress Report (FY 1978).
Technical note,
Martin G. Fagot, and Bruce E. Eckstein. Feb 79, 76p Rept no. NORDA-TN-41

The Navy's interest in the lower region of the acoustic frequency domain has increased the need for more definitive models of the ocean's subbottom as a transmission media that refracts, diffracts, diffuses and dissipates, as well as reflects, acoustic energy. A multi-channel array system towed near the bottom in the deep ocean provides the capability to determine the detailed geophysical character of the subbottom structure and thus provides the high resolution geoacoustic input parameters required for modeling. This report presents the progress during FY78 on the development of a deep-towed system. The report reviews progress on the development of a system performance prediction model, interval velocity measurement considerations, and deep tow sound source requirements. (Author)

AD-A074 096/9 PC **A04**/MF **A01**
Columbia Univ Dobbs Ferry NY Hudson Labs
High Power Sonar Transmitter Using Parallel Inverter Unit.
Memorandum rept.,
F. L. Hunsicker. 5 Oct 62, 54p NRL-MR-1363
Contract Nonr-266(84)

This report describes the performance of a high power sonar transmitter, which uses semiconductor components, driving 400 cycle per second electromagnetic variable reluctance type transducers. The input voltage to the transmitter is three phase, sixty cps which is first rectified and then converted to a single phase output voltage by a parallel inverter unit using silicon controlled rectifiers. By selecting the values of the series inductance and the parallel capacitor in the inverter unit so that they were resonant at the resonant frequency of the transducer load, the output voltage of the transmitter was nearly sinusoidal at this frequency. At other frequencies the output voltage was sometimes strongly distorted and changed in level due principally to the change in transducer impedance. Transmitter efficiencies of up to 75 percent were measured. The appendix contains response curves, beam patterns and the calculated values of efficiencies of the transducer loads used in the test.

AD-A074 107/4 PC **A02**/MF **A01**
Columbia Univ Dobbs Ferry NY Hudson Labs
AN/SSQ-28 Sonobuoy Laboratory Evaluation.
Investigative rept.,
Walter L. Leupold. 11 Sep 62, 24p NADC-AW-6227
Contract NONR-266(84)

This is a report on the results of an investigation on the performance of the AN/SSQ-28 sonobuoy under laboratory and simulated environmental conditions. The investigation was conducted to evaluate new measuring techniques and to determine if the equipment operated in conformance with Specification MIL-S-22485(WEP). The sonobuoys were made available from each of the present manufacturers of the AN/SSQ-28. This report covers the areas in which these sonobuoys did not meet the required limits of this specification.

AD-A074 110/8 PC **A04**/MF **A01**
Naval Air Development Center Warminster PA Anti-Submarine Warfare Lab
Investigation of Possible Improvements to Sonobuoy Launchers and Retardation Devices to Decrease the Errors Found in Sonobuoy Spacing.
Phase rept.,
F. G. Amey. 28 Jun 61, 73p Rept no. NADC-AW-6103

This report presents the results of a controlled flight test program to investigate possible improvements in sonobuoy launching and retardation equipment for the purpose of decreasing errors in sonobuoy spacing. The P2V aircraft standard sonobuoy launching equipment with modifications by the Naval Air Development Center (NAVAIRDEVCEN) to launch stores at various angles to the aircraft horizontal datum plane and orient the retardation means within the launching tube was evaluated under actual flight conditions to determine the effect on sonobuoy trajectory and placement accuracy. (Author)

AD-A074 133/0 PC **A06**/MF **A01**
Naval Research Lab Washington DC
Handling, Storage and Maintenance of the Array Structure Installed on the USNS MISSION CAPISTRANO (T-AG 162).
Technical manual,
Arthur D. Darden. 12 Apr 63, 106p.p Rept no. NRL INSTRUCTION BOOK-38

Described are the equipment and operational procedures that will be employed in lowering, hoisting, securing for transportation, and maintaining an assembly herein referred to as the array, during the mobile operations of Project ARTEMIS.

AD-A074 314/6 PC **A05**/MF **A01**
Naval Postgraduate School Monterey CA
A Microcomputer-Based Digital Data Acquisition Controller for a Computer Aided Acoustic Imaging System.
Master's thesis,
Rodney Alvie Colton. Jun 79, 97p

This thesis describes the design and construction of a microcomputer based controller for an ultrasonic acoustic imaging system. The INTEL 8748 single chip microcomputer was utilized and the associated hardware and software for the system are described in detail. Carefully designed and tested operating instructions are provided along with an explanation for each instruction. The system is fully documented, thus allowing future personnel to change or update the system as required to take full advantage of the flexibility of a microcomputer based design. (Author)

PATENT-4 145 680
Not available NTIS
Department of Energy, Washington, DC.
Acoustic Imaging System.
Patent,
R. W. Smith. Filed 18 Oct 77, patented 20 Mar 79, 10p PAT-APPL-843 182
Supersedes PAT-APPL-843 182-77.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention discloses an acoustic imaging system for displaying an object viewed by a moving array of transducers as the array is pivoted about a fixed point within a given plane. A plurality of transducers are fixedly positioned and equally spaced within a laterally extending array and operatively directed to transmit and receive acoustic signals along substantially parallel transmission paths. The transducers are sequentially activated along the array to transmit and receive acoustic signals according to a preestablished sequence. Means are provided for generating output voltages for each reception of an acoustic signal, corresponding to the coordinate position of the object viewed as the array is pivoted. Receptions from each of the transducers are presented on the same display at coordinates corresponding to the actual position of the object viewed to form a plane view of the object scanned. (ERA citation 04:050454)

17B. Communication

AD-A073 841/9 PC **A03**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Meteor Radio Electronics,
Ye. I. Fialko. 9 Feb 79, 45p Rept no. FTD-ID(RS)T-2243-78
Unedited machine trans. of Izvestiya Vysshikh Uchebnykh Zavedeniy SSSR, Radioelectronika (USSR) v12 n5 p445-460 1969.

No abstract available.

AD-A073 900/3 PC **A03**/MF **A01**
RAND Corp Santa Monica CA
Nomograms for the Calculation of Propagation Effects on Tactical Millimeter-Wave Radio Links.
Interim rept. 1 Jan-1 Jul 79,
William Sollfrey. Aug 79, 36p CORADCOM-77-0142-1
Contract DAAB07-77-C-0142

Description of the development and use of nomograms for calculating propagation effects on tactical millimeter-wave radio links. The principal causes of attenuation in the millimeter-wave band (35-75 GHz) are oxygen absorption, which depends on radio frequency, and rain scattering, which depends on frequency, and rain rate. The nomograms display these dependencies and the range equation, and may be used to calculate communication system performance as a function of range, frequency, and rain rate by simply drawing straight lines between scales. Use of the nomograms is illustrated by several worked examples. By following the techniques demonstrated in the examples, the user should be able to solve link performance problems speedily and simply. (Author)

AD-A073 928/4 PC **A07**/MF **A01**
Naval Postgraduate School Monterey CA
Design of the Digital Control and Test Unit Subsystems for a Satellite Signal Analyzer.
Master's thesis,
Clyde Musgrave. Jun 79, 143p

The Satellite Signal Analyzer (S.S.A.) will provide Real Time Spectrum Analysis of Communication Satellite UHF Signals. This thesis documents the digital control and test unit subsystems of this S.S.A. The digital control subsystem was designed and built to interface the PDP 11/34 MINICOMPUTER to all digitally controlled devices within the system. The control bus (CIB) provides 32 BITS of digital control on a single board. The TEST UNIT subsystem was designed and built to provide the capability to monitor various signals within the S.S.A. as well as conduct self-checks. The TEST UNIT is capable of measuring the Noise Figure/Temperature of the system receivers, monitoring the level and frequency of system signals, injecting signals into the receivers and transmitting signals to satellites.

AD-A073 964/9 PC **A08**/MF **A01**
Naval Postgraduate School Monterey CA
Techniques and Benefits of Shaping the Pulses of Binary Sequences with Application to Spread Spectrum Radio Communications.
Master's thesis,
Panayiotis G. Mavraganis. Mar 79, 153p

This research is concerned with binary sequences. Such two-level voltage waveforms are used in

some types of spread spectrum systems. Of interest in this work is the effect of shaping the normally rectangular pulses of the binary sequence. An objective is to find and tabulate particular sequences and specific shapes having desirable autocorrelation functions and power spectra. A direct and versatile method of shaping binary sequences is presented. Photographs of sequences having triangular, raised sine and ramp shapes are included in the report. Photographs of the autocorrelation function and spectra of selected shaped sequences are presented. The computer programs used to search for sequences of interest and used to calculate the autocorrelation function and spectra of particular shaped sequences are described. Shaped sequences having interesting spectra were discovered. For example, some spectra have very small side lobe levels; others have no discernible nulls in the spectra; some spectra have nulls which are not simply related to the sequence clock frequency (pulse rate). (Author)

AD-A074 018/3 PC **A03**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Capacity Allocation Techniques in a Multi-User Satellite System.
Technical note,
John I. Capetanakis. 18 Jul 79, 38p TN-1979-34, ESD-TR-79-185

The multiple accessing of satellite by a large number of independent users is considered. The messages are generated randomly, and they are of fixed length. Depending on the accessing protocol, such a system may exhibit congestion instabilities, long message delays, or low throughput. Several important protocols (that are applicable to such a system and which fall into the categories of direct access, reservation access, and polling access) are presented and evaluated. The E (delay) vs E (throughput) performances of the various protocols are obtained and compared. Its is shown (for a specific example) that demand assignment access with a TREE reservation protocol is best for throughput up to about 70%, whereas polling access is best in heavier message traffic. (Author)

AD-A074 047/2 PC **A15**/MF **A01**
Harris Corp Melbourne FL Electronic Systems Div
Linear Modulation Techniques for Digital Microwave.
Final technical rept. Mar 77-Nov 78,
Robert C. Davis. Aug 79, 333p RADC-TR-79-56
Contract F30602-77-C-0039

The objective of this program was to study and develop modulation techniques and implementation methods applicable to a linear digital microwave radio operating in the 4 and 8 GHz frequency bands. Modulation techniques capable of providing 3 to 4.5 bits/sec/Hz under the FCC Docket 19311 spectral criterion are developed and included herein. Techniques for the practical implementation of spectrally efficient linear modulation (AM-PM) signal designs in conjunction with presently available microwave power amplifiers are developed. An adaptive predistortion technique for linearizing nonlinear power amplifiers (e.g., TWT's) for the purpose of counteracting AM/AM and AM/PM conversion effectsis presented which is useful for linear digital signal designs. A new baseband adaptive equalization scheme which is suited to high rate digital modems is presented. M-ary Quadrature Amplitude Modulation (M-QAM) is chosen as the most efficient scheme for obtaining 3 to 5 bits/sec/Hz under FCC Docket 19311. Waveguide filtering is used to provide FCC Docket 19311 compliance with the M-QAM schemes. An error correction coding/decoding strategy which is applicable to M-QAM signal formats is presented. On the theoretical side, techniques for determining spectral and prformance properties for constrained bandwidth digital signaling are discussed. (Author)

AD-A074 082/9 PC **A03**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Speech Enhancement Using a Soft-Decision Maximum Likelihood Noise Suppression Filter.
Technical note,
Robert J. McAulay, and Marilyn L. Malpass. 19 Jun 79, 40p TN-1979-31, ESD-TR-79-163
Contract F19628-78-C-0002

One way of enhancing speech in an additive acoustic noise environment is to perform a spectral decomposition of a frame of noisy speech and to attenuate a particular spectral line depending on how much the measured speech plus noise power exceeds an estimate of the background noise. Using a two state model for the speech event (speech absent or speech present) and determining the maximum likelihood estimator of the speech power results in a new class of suppression curves which permits a tradeoff of noise suppression against speech distortion. The algorithm has been implemented in real time in the time domain, exploiting the structure of the channel vocoder. Extensive testing has shown that the noise can be made imperceptible by proper choice of the suppression factor. (Author)

AD-A074 084/5 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Analysis of Certain Structures of Data Transmission Devices,
R. I. Shneyder. 6 Dec 78, 18p Rept no. FTD-ID(RS)T-1910-78
Edited trans. of Voprosy Promyshlennoy Kibernetiki (USSR) n29 p62-66 1971, by Robert D. Hill. Formulas, Charts and Diagrams in Russian.

No abstract available.

AD-A074 129/8 PC **A10**/MF **A01**
ARINC Research Corp Annapolis MD
Handbook of Procedures: Reliability and Maintainability Monitoring Program for the Marine Air Command and Control System (MACCS).
Dec 74, 205p Rept no. 1302-01-4-1362
Contract M00027-74-C-0099

The purpose of this program is to provide an independent and objective monitoring of the failure and maintenance probiems of the Marine Air Command and Control System (MACCS). The specific portions of the MACCS being monitored are the Tactical Air Command Central, AN/TYQ-1; the Tactical Air Operations Central, AN/TYQ-2; the Tactical Data Communications Central, AN/TYQ-3; the Radar Set, AN/TYQ-32; and other equipments associated with these systems. This is being accomplished by monitoring actual performance data relative to design objectives, identifying problem areas, and recommending specific corrective action. This handbook provides the program documentation used to perform the Reliability and Monitoring Program for the MACCS. It consists of a detailed description of the characteristics and features of the MACCS R&M program; a complete list of computer instructions and data used in solving the problem for which the program is designed; the design criteria for the subject program in functional terminology and flow charts showing control flow in the program; and the program operating procedures necessary to perform all aspects of program operation.

AD-A074 149/6 PC **A14**/MF **A01**
Army Infantry School Fort Benning GA
Infantry Communication Data.
Jan 69, 324p

No abstract available.

AD-A074 206/4 PC **A06**/MF **A01**
Texas Instruments Inc Dallas
Limited Vocabulary Continuous Word Recognition.
Final technical rept. Aug 77-Jan 79,
Robert L. Davis, Bruce G. Secrest, and Craig J. Cato. Aug 79, 120p RADC-TR-79-204
Contract F30602-77-C-0139

The objective of this contract was to develop the capability of recognizing a limited vocabulary (20 words) from continuous speech, independent of a limited number of speakers. The research during this study contract was concentrated in three major areas: (1) High-performance, speaker-independent, connected-digit recognition for syntactically unconstrained digit sequences. (2) Clustering algorithms for use in the development of sets of reference patterns for speaker-independent word recognition. (3) Automatic enrollment for speaker-dependent, connected-word recognition for syntactically unconstrained word sequences of 20 words.

AD-A074 313/8 PC **A03**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
A New Class of Optical Communication Systems. I. Experiment.
Memorandum rept.,
Paul H. Deitz, Gary L. Durfee, and Stephen S. Wolff. Jul 79, 26p ARBRL-MR-02930, AD-E430 294

A new class of optical communication schemes is described in which a message is coded spatially in a random phase process and detected at many points at the receiver. This process may be termed a spatial-multiplex, spatial-diversity optical communication scheme. The technique shows relative immunity to the effects of atmospheric turbulence. Also, relative security of the method is assured since detection can take place only when radiation is detected and processed at many points within the beam itself. (Author)

AD-A074 367/4 PC **A03**/MF **A01**
National Communications System Washington DC
CCITT Criteria for the Evaluation of Two-Dimensional Facsimile Coding Techniques.
Technical information bulletin,
Dennis Bodson. Aug 79, 50p NCS-TIB-79-7, AD-E100 279

This Technical Information Bulletin (TIB) describes the USA contribution submitted to CCITT Study Group XIV (COM XIV - No. 66-E) on proposed evaluation criteria for facsimile compression algorithms. The basis for this contribution is contained in NCS TIB 79-6. In addition, CCITT contribution COM XIV - No. 70-E delineates modifications to contribution COM XIV - No. 66E.

ED-167 109 Not available NTIS
New York State Coll. of Agriculture and Life Sciences, Ithaca.
Communication Strategies for Rural Development.
Rept. no. 7,
Robert H. Crawford. Sep 74, 24p
For related documents, see IR-006 846-851 and ED-162 648.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$1.67, MF$0.83 Plus Postage. Also available from The Communication Arts Graduate Teaching and Research Center, Cornell Univ., 640 Stewart Avenue, Ithaca, NY. 14853 (single copies are free).

There is a wide range of communication needs in rural development programs, including the need to develop comprehensive communication strategies for program fulfillment. Such strategies call for communication specialists whose expertise transcends the 'information' role and includes the whole process of development. This process must not neglect an analysis of communication support factors such as audience, bureaucracy, and consumers; and decisions about program interrelations, program messages, media selection, overall implementation strategy, timing, and feedback and assessment. These aspects of a development program are at least as important as the technical aspects, and require equal care and attention in planning and budgeting.

ED-167 110 Not available NTIS
New York State Coll. of Agriculture and Life Sciences, Ithaca.
The Frontiers of Communication.
Rept. no. 8,
Royal D. Colle. Sep 74, 21p
For related documents, see IR-006 846-851 and ED-162 648.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, MF$0.83 Only, Plus Postage. Also available from The Communication Arts Graduate Teaching and Research Center, Cornell Univ., 640 Stewart Avenue, Ithaca, NY. 14853 (single copies are free).

Although expensive and sophisticated communications technologies tend to be popular as tools of rural development, the real frontier of communication in rural development is comprised of the simpler, less expensive technologies that put the

means of communication into the hands of the rural population. Simple, inexpensive equipment such as audio cassette tape (ACT) systems and 8mm film technology shows the greatest promise in making the rural receiver more of an active participant in the communication process. ACT systems can be valuable tools in listening groups, training, information dissemination in family planning, and as tools for field workers; and these systems enable the information receiver to control the listening situation. More expensive, simple radio technology in basic village education and radio schools can also be an effective tool in rural development.

ED-167 113 Not available NTIS
New York State Coll. of Agriculture and Life Sciences, Ithaca.
Communicating with Villagers,
Royal D. Colle. Aug 76, 19p
Paper presented at the Planning Seminar on Agriculture for Nutritional Improvement, East-West Food Institute in Honolulu, Hawaii, on August 16-17, 1976. For related documents, see IR-006 846-851 and ED-162 648.
Available from ERIC Document Reproduction Service (Computer Microfilm International Corporation), Arlington, VA. 22210, PC$1.67, MF$0.83 Plus Postage.

Common problems and possible solutions in communication with rural villagers in developing countries are discussed in terms of communication extension strategies, mass communication media, the use of simple communication technology in place of the more sophisticated and expensive methods, a case study of successful communication project in Guatemala, the para-professional as a supporting interpersonal link between developing agencies and villagers, and communication satellites. Eight guidelines are included for developing an explicit communication strategy to be integrated into the overall project approach.

N79-31248/4 PC **A12**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands).
A Low-Cost Ground Station for Reception and Preprocessing of Remote Sensing Satellite Data.
N. J. J. Bunnik, H. A. Vaningenschenau, C. A. Schmeitink, J. T. Hoeve, and G. J. H. Wensink.
Dec 78, 264p NLR-TH-78119-L, ESA-CR(P)-1180
Contract ESA-3525/78-F-DK(SC)
Subm-Prepared in Cooperation with Hollandse Signaalapparaten N. V. Misc- Original Contains Color Illustrations.

A conceptual design for a low-cost ground station for reception and preprocessing of remote sensing satellite data is described. An assessment was made of key applications and user requirements for a local station situated in a developing country. A survey of existing and planned remote sensing satellites and ground stations is presented. For prospective applications in developing countries and within the low-cost approach, attention is given to reception of the low bit rate LANDSAT-MSS and SPOT-HRV data. Data reduction by means of limitation of the coverage area and selection of useful data, satisfying image quality criteria, is proposed to reduce cost of front-end, preprocessing, archiving and data management. An overall cost reduction of the front-end for the required coverage radius of the station is obtained by application of an antenna with a 4.6 m diameter and a low-noise high-gain pre-amplifier of 60 K and 30 dB for LANDSAT-MSS.

N79-31264/1 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Life Characteristics Assessment of the Communications Technology Satellite Transmitter Experiment Package.
J. Smetana, and A. N. Curren. Jul 79, 52p NASA-TM-79181, E-049

The performance characteristics of the transmitter experiment package (TEP) aboard the Communications Technology Satellite (CTS) measured during its first 2 years in orbit are presented. The TEP consists of a nominal 200 watt output stage tube (OST), a supporting power processing system (PPS), and a variable conductance heat pipe system (VCHPS). The OST, a traveling wave tube augmented with a 10 stage depressed collector has an overall saturated average efficiency of 51.5 percent and an average saturated radio frequency (rf) output power at center band frequency of 240 watts. The PPS operated with a measured efficiency of 86.5 to 88.5 percent. The VCHPS, using three pipes to conduct heat from the PPS and the OST to a 52 by 124 centimeter radiator fin, maintained the PPS baseplate temperature below 50 C for all operating conditions. The TEP performance characteristics presented include frequency response, rf output power, thermal performance, and efficiency. Communications characteristics were evaluated by using both video and audio modulated signals. On four occasions, the TEP experienced temporary thermal control system malfunctions. The anomalies were terminated safely, and the problem was investigated because of the potential for TEP damage due to the signficant temperature increases. Safe TEP operating procedures were established.

N79-31455/5 PC **A07**/MF **A01**
Politecnico di Torino (Italy). Inst. di Electtronica e Telecomunicazioni.
Performance Analysis of a Nonlinear Satellite Channel Using Volterra Series.
Final Report.
M. Ajmone-marsan, S. Benedetto, E. Biglieri, and R. Daffara. Dec 77, 130p ESA-CR(P)-1212
Contract ESTEC-2328/74-HP

An analytical treatment of digital satellite communication systems operating over nonlinear channels is presented. The effect of a nonlinear amplifier located in the satellite is considered in combination with that of transmitting and receiving filters located in the earth stations. In addition, both uplink and downlink noise are taken into account. The analysis method is based on a Volterra series representation of the overall channel. The basic advantage of this approach is the generality it offers for the study and an important achievement is that accurate evaluation of the error probability in a digital communication scheme is possible in a short computer time. The technique is applied to a coherent PSK scheme in which the program VOLPSK is used. A users manual, programmers manual, and list of programs is included for this evaluation.

PB80-104243 Not available NTIS
National Bureau of Standards, Washington, DC.
Interpreting the Scientific Paper for the Trade Press.
Final rept.,
F. P. McGehan. May 79, 3p
Pub. in Proceedings of the International Technical Communication Conference (26th) Held at Los Angeles, CA. on May 16-19, 1979, pM-115-M-117, May 79.

The technical communicator serves as a valuable liaison between the scientific institution and the world of trade and technical publications. When sifted through the communicator's skillful hand, the scientist's technical work can reach larger audiences and have greater impact than publication only in an archival journal. The communicator must be familiar with the needs of trade and technical publications editors in order to advise the scientist-author. An up-to-date mailing list of trade and technical publications is a valuable aid to the communicator. This specialized knowledge can mean the difference between success and failure in obtaining exposure for an agency's technical output. Once the publications have been targeted, then it is the job of the communicator to reach those publications through announcements, technical news releases and specialized articles. These releases should be based on technical reports and/or discussions with the bench scientists.

17D. Electromagnetic and Acoustic Countermeasures

AD-A073 993/8 Not available NTIS
Polytechnic Inst of New York Farmingdale
A Uniform Power Spectral Density Jamming Signal,
F. Cassara, E. Muth, and D. Gettys. 4 Aug 78, 3p ARO-14941.3-EL
Grants DAAG29-77-G-0232, NSF-ENG76-24468
Availability: Pub. in Proceedings of the IEEE, v67 n2 p330-332 Feb 79 (No copies furnished by DDC).

No abstract available.

PATENT-4 149 167 Not available NTIS
Department of the Army Washington DC
Radar Jamming Transmitter.
Patent,
Philip H. Peters, Jr., and Donald A. Wilbur. Filed 4 Mar 55, patented 10 Apr 79, 5p AD-D006 349/5, PAT-APPL-492 327
Supersedes PAT-APPL-492 327-55.
Availability: This Government-owned invention available for U.S. Licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent relates to an automatic radar jamming transmitter comprising a plurality of voltage-tuned magnetrons, each adapted to be tuned over a prescribed wide range of frequencies, discrete voltage tuning means in circuit with each of said magnetrons, respectively, whereby each of said magnetrons initially and simultaneously generate radio-frequency energy at prescribed discrete frequencies, means for simultaneously varying said discrete voltage tuning means in a random manner, whereby the discrete outputs of said magnetrons comprise simultaneously generated frequency modulated noise signals, means for amplifying said noise signals, and means in circuit with said amplifying means for producing random changes in the amplitudes of said noise signals. (Author)

PATENT-4 164 741 Not available NTIS
Department of the Air Force Washington DC
Deception Circuitry for Automatic Range Gate Tracking in Fire Control Radar.
Patent,
Jerry D. Schmidt. Filed 13 Sep 68, patented 14 Aug 79, 5p AD-D006 318/0, PAT-APPL-761 891
Supersedes PAT-APPL-761 891-68.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An acoustic delay in a feed-back loop in the traveling wave tube repeater chain of an electronic countermeasures system provides a wider transmitted pulse (than the pulse received by the ECM system), resulting in range gate deception in an opposing tracking radar.

17E. Infrared and Ultraviolet Detection

AD-A073 955/7 PC **A02**/MF **A01**
Battelle Columbus Labs OH
Influence of Stoichiometry on Impingement Erosion of Lead Sulfide and Zinc Selenide.
Final rept. 1 Jun 78-30 Apr 79,
R. G. Hoagland, and I. G. Wright. 14 Aug 79, 18p AFOSR-TR-79-0959
Contract AFOSR-77-3283

The results of a series of water droplet impingement erosion experiments on lead sulfide and zinc selenide are described. The work with single crystal lead sulfide sought to correlate the mechanisms of surface damage with mechanical strength, lead sulfide affording an opportunity to study the effect of a range of hardness, caused by a shift in stoichiometry into the p-type range, in specimens otherwise similar in elastic properties and pre-existing dislocation substructures. Dislocations involved in the deformation resulting from water droplet impacts were revealed by etch pitting. The size and nature of the impact sites on all the lead sulfide specimens studied, using 0.42 mm water droplets impacting at 100-168 m/s, was found to be in fact highly stochastic. The deformation produced was strongly dependent upon the pre-existing arrangement of dislocations at the impact site, and considerable effort was expended in obtaining suitably dislocation-free crystal surfaces. The polycrystalline zinc selenide examined is a prime candidate material for windows for IR imaging devices. The grain boundaries in this material appeared to act as flaw sites which, upon repeated impact, led to the encirclement of complete grains by cracks, with consequent material loss.

AD-A074 085/2 PC **A02**/MF **A01**
California Univ Berkeley Electronics Research Lab
Antenna-Coupled Infrared Detectors.
Final rept. 15 Jun 76-14 Jun 79,
S. E. Schwarz. 14 Jun 79, 8p ARO-13770.6-EL
Grant DAAG29-76-G-0284

Planar sub-millimeter and near-millimeter antennas have been studied. These antennas are suitable for integration with mixer diodes and infrared detectors. Antenna-coupled microbolometer far-infrared detectors have been built. These offer an advantageous combination of room-temperature operation, detectivity, and speed. Integrated antenna-coupled Schottky diode mixers are being developed. (Author)

AD-A074 115/7 Not available NTIS
California Univ Berkeley Electronics Research Lab
Microbolometers for Infrared Detection,
Tien-Lai Hwang, S. E. Schwarz, and D. B. Rutledge. 8 Jan 79, 4p ARO-13770.5-EL
Contract F44620-76-C-0100, Grant DAAG29-76-G-0284
Sponsored in part by Grant NSF-ENG77-16059.
Availability: Pub. in Applied Physics Letters, v34 n11 p773-776, 1 Jun 79 (No copies furnished by DDC).

No abstract available.

AD-A074 122/3 Not available NTIS
University of Southern California Los Angeles Center for Laser Studies
Fast Response of PLZT Pyroelectric Detectors to Megawatt CO2 Laser Pulses,
M. Simhony, M. Bass, E. W. Van Stryland, E. M. Tenescu, and B. Levy. 28 Nov 78, 3p ARO-1455.2-P
Grant DAAG29-77-G-0147
Prepared in cooperation with Hebrew Univ., Jerusalem (Israel). Racah Inst. of Physics.
Availability: Pub. in IEEE Jnl. of Quantum Electronics, vQE-15 n4 p206-208 Apr 79 (No copies furnished by DDC).

No abstract available.

17F. Magnetic Detection

AD-A074 051/4 PC **A07**/MF **A01**
Ohio State Univ Columbus Electroscience Lab
Radiative Transmission Line Analysis.
Final technical rept. 4 Feb 77-30 Sep 78,
R. J. Garbacz, J. Richmond, B. Tran, M. Kuznetsov, and F. McQuillin. Jun 79, 127p ESL-784659-5, RADC-TR-79-158
Contract F19628-77-C-0069

This Final Report summarizes the results of work accomplished on the theoretical analysis of two types of transmission lines for use as intruder sensors. One type is the Yagi line consisting of uniformly spaced, imperfectly conducting thin rods of identical length which are suspended a uniform height above and perpendicular to a lossy flat earth. A second type of line investigated theoretically is the single coaxial cable whose outer shield is perforated by circumferential rectangular slots, each one narrow in longitudinal extent, subtending an arc of arbitrary length and spaced uniformly along the line's extent. The cable has an imperfectly conducting circular center conductor separated by a lossy dielectric from the outer shield which is assumed to be perfectly conducting and infinitesimally thin.

AD-A074 106/6 PC **A02**/MF **A01**
Columbia Univ Dobbs Ferry NY Hudson Labs
Preproduction Environmental Testing of AN/ASQ-10 and RO-32 Recorder, Manufactured by Dubrow Electronic Industries, Inc., Burlington, New Jersey.
Final rept.,
D. R. Darrigo. 2 Feb 62, 8p NADC-AW-6120
Contract Nonr-266(84)

The AN/ASQ-10 magnetic detecting set is an airborne magnetometer designed to detect the presence of a submarine by measuring the magnetic anomaly produced on the earth's magnetic field by the submarine. Bench and environmental tests were conducted on the AN/ASQ-10 equipment.

17G. Navigation and Guidance

AD-A074 080/3 PC **A02**/MF **A01**
Electronics Engineering Group (1842nd) Scott AFB IL
Radar Approach Control (RAPCON) Primary Input Power Supply Study.
Technical rept.,
Robert L. Boyce. 15 Aug 79, 25p Rept no. 1842 EEG/EEISG-TR-79-15

This study compiles the findings, conclusions and recommendations of the 1842 EEG regarding RAPCON equipment failures. (Author)

AD-A074 146/2 PC **A02**/MF **A01**
Army Missile Research and Development Command Redstone Arsenal AL Technology Lab
Deviate Proportional Navigation.
Technical rept.,
Richard E. Dickson. 9 Apr 79, 13p Rept no. DRDMI-T-79-46

A variation of proportional navigation in which the attitude or approach direction at intercept is also controlled is described. Additional sensors are not required but additional on-board computation is required. The derivation is based upon an optimal intercept law. (Author)

N79-31186/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Flight Performance of the TCV B-737 Airplane at Kennedy Airport Using TRSB/MLS Guidance.
W. F. White, and L. V. Clark. Jul 79, 29p NASA-TM-80148

The terminal configured vehicle (TCV) B 737 was flown in demonstration of the time reference scanning beam/microwave landing system (TRSB/MLS). The flight performance of the TCV airplane during the demonstration automatic approaches and landings while utilizing TRSB/MLS guidance is reported. The TRSB/MLS is shown to provide the terminal area guidance necessary for flying curved automatic approaches with short finals.

N79-31187/4 PC **A02**/MF **A01**
Ohio Univ., Athens. Avionics Engineering Center.
Digital Phase-Locked Loop Development and Application to LORAN-C.
D. L. Mccall. Sep 79, 14p NASA-CR-162283, TM-69
Contract NGR-36-009-017

A digital phase-locked loop was developed and implemented for use in a low cost Loran C receiver. The digital phase-locked loop design is described and it's application to Loran C is discussed.

N79-31188/2 PC **A09**/MF **A01**
Royal Aircraft Establishment, Farnborough (England).
The Significance of the Ellipsoid Shape of the Earth in Aerial Navigation.
Master's Thesis,
L. Kiefer. Mar 79, 180p RAE-LIB-TRANS-2001, BR69303
Tran-Transl. Into English from German Thesis, Ger. Geodetic Comm. Publ. No. 166, Ser. C (Munich), 1971.

Formulas which take into account the ellipsoid shape of the earth are presented. The formulas were used to analyze measurements used in aerial navigation. The possibility of representing the earth as a sphere was examined and the idea was discarded because calculation errors were so great. A new approximate method is presented of calculating the distance between two widely separated points. Also, astro navigation calculations via elevation sightings were investigated and the accuracy of the calculations was evaluated.

17H. Optical Detection

AD-A074 238/7 PC **A03**/MF **A01**
Army Electronic Proving Ground Fort Huachuca AZ
Night Television System.
Final rept.,
William A. McKeen. Jan 61, 26p Rept no. USAEPG-SIG-930-170

Tests were conducted during a 15-month period from January 1957 to March 1958 to determine the effectiveness of the type 6849 Image Orthicon Camera Tube manufactured by Radio Corporation of America, as a light-sensitive pickup device when used in television camera systems during the hours of darkness. Three lenses were used during the tests: An f/0.87 76mm, an f/1.9 50mm, and an f/3.8 135mm. Preliminary tests under low light level conditions revealed that the f/0.87, 76mm Super-Farron high speed objective lens, manufactured by the Farrand Optical Company, New York City, New York, was the only lens of those tested which yielded useful imagery. Field tests were conducted over the period 10 days before and 10 days after full moon under 'visibility unlimited' conditions. Controlled laboratory tests were conducted using incandescent lamps for illumination.

PATENT-4 123 165 Not available NTIS
Department of the Army Washington DC
Attitude Determination Using Two Color, Dual-Sweeping Laser System.
Patent,
David B. Brown, Jerry W. Vickers, and Kynric M. Pell. Filed 31 May 77, patented 31 Oct 78, 9p AD-D006 329/7, PAT-APPL-801 885
Supersedes PAT-APPL-801 885-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A system is provided for remote determination of the attitude of a vehicle. Onboard the vehicle are located two separate arrays of corner cube retroreflectors. Each array of retroreflectors is arranged to form a band around the vehicle at one axial position. The two arrays of reflectors incorporate different optical filters so that each array of reflectors and filters is optimized to provide retroreflection in a particular narrow band of the optical spectrum. The system utilizes a remotely located transmitting-receiving station to provide tracking of the vehicle, continuously sweeping the vehicle with a light source located at the station so that position and attitude of the object, relative to the remote station, are obtained. Included at the ground station are two multimode, continuous wave lasers each providing a single two-color beam which matches the bands of the spectrum of the filtered retroreflecting arrays onboard the vehicle.

PATENT-4 123 168 Not available NTIS
Department of the Army Washington DC
Laser Optical Lever Adjunct.
Patent,
Thomas H. Howell. Filed 22 Jul 77, patented 31 Oct 78, 4p AD-D006 330/5, PAT-APPL-818 187
Supersedes PAT-APPL-818 187-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a system and apparatus for accurate measurement of a rocket's attitude that includes a laser source placed downrange and pointed towards the rocket with a diverging beam. The beam will be intercepted by a mirror on the rocket's ogive, and the reflected beam will then be presented on a vertical target. A detector assembly positioned behind the vertical target plane detects the centroid of the reflected energy and provides an analog output signal. (Author)

17I. Radar Detection

AD-A073 881/5 PC **A02**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Millimeter Airborne Radar Target Detection and Selection Techniques.
Journal article,
Leslie M. Novak, and Frederick W. Vote. 1979, 11p MS-4885, ESD-TR-79-169
Contract F19628-78-C-0002
Pub. in Proceedings of the National Aerospace Electronics Conference (IEEE), 1979, p807-817.

No abstract available.

AD-A074 157/9 PC **A05**/MF **A01**
Oregon State Univ Corvallis Dept of Electrical and Computer Engineering
Simulation of Communications Protocols for a Tactical Radar Network. Part I. Executive Summary.
Final rept.,
C. J. Warner, and J. D. Spragins. 13 Aug 79, 80p
AFOSR-TR-79-0985
Grant AFOSR-78-3619

An advanced forward area tactical radar network is now under conceptual development by the Air Force Electronic Systems Division. The proposed network will link together a number of short-range radars, each with associated data processing equipment, so that each radar site has a complete file of tracks for all targets seen by any radar in the network. In addition, the communication network is expected to be used for transmission of a variety of other types of command and control messages. A new class of adaptive routing protocols for computer communication networks has been developed in this research using the radar network as a basis. These new routing protocols utilize new techniques for searching out and using both reciprocal paths (paths over which messages can travel in either direction) and non-reciprocal paths (paths over which messages can travel in only one direction) for directed message routing. A GPSS simulation model of a thirteen node radar network was used to determine the transient characteristics of the new routing protocols while adapting to various cases of network damage. These tests indicate that the new routing algorithms possess varying degrees of adaptability to network damage. Some of the new routing algorithms were shown to possess the capability to adapt to extreme cases of network damage.

AD-A074 250/2 Not available NTIS
Alabama Univ University Dept of Electrical Engineering
Velocity Response Characteristics of MTI Radars Using Pulse or Block Stagger.
Ronald C. Houts. 1977, 6p ARO-13720.4-ELX
Grant DAAG29-76-G-0212
Availability: Pub. in Radar-77, International Conference Held on 25-28 Oct 77, p176-181 (No copies furnished by DDC).

No abstract available.

N79-31443/1 PC **A05**/MF **A01**
Lockheed Missiles and Space Co. Inc., Sunnyvale, CA.
Linear Approximation SAR Azimuth Processing Study.
Final Report.
R. B. Lindquist, R. K. Masnaghetti, E. Belland, H. V. Hance, and W. G. Weis. 20 Mar 79, 91p
NASA-CR-162169, LMSC-D615761
Contracts NAS7-100, JPL-955072
Subm-Sponsored in Part by DOE Prepared for JPL.

A segmented linear approximation of the quadratic phase function that is used to focus the synthetic antenna of a SAR was studied. Ideal focusing, using a quadratic varying phase focusing function during the time radar target histories are gathered, requires a large number of complex multiplications. These can be largely eliminated by using linear approximation techniques. The result is a reduced processor size and chip count relative to ideally focussed processing and a correspondingly increased feasibility for spaceworthy implementation. A preliminary design and sizing for a spaceworthy linear approximation SAR azimuth processor meeting requirements similar to those of the SEASAT-A SAR was developed. The study resulted in a design with approximately 1500 IC's, 1.2 cubic feet of volume, and 350 watts of power for a single look, 4000 range cell azimuth processor with 25 meters resolution.

N79-31747/5 PC **A06**/MF **A01**
Thomson-CSF, Meudon-la-Foret (France). Dept. Espace-Satellites.
Study of SAR for the European Remote Sensing Program: Executive Summary.
Final Report.
11 Dec 78, 114p ESA-CR(P)-1174
Contract ESA-3523/78-F-CG(SC)
Subm-Prepared in Cooperation with Dornier-Werje G.M.B.H., Friedrichshafen and Selenia S.p.a., Rome. Misc- Original Contains Color Illustrations.

A detailed analysis of system specification, spacecraft interfaces, the influence of system geometry, image quality requirements, and processing tasks is presented followed by a trade-off study leading to the choice of orbit altitude, look angle, pulse duration, pulse repetition frequency, antenna dimensions, radar resolution, RF power, onboard/onground interface, and downlink modulation technique. The main critera directing the trade-off study were the reduction of the RF power and the compatibility with present platform design. A baseline configuration scheme is given, showing a resulting 310 W average RF power or an orbit altitude of 822 km.

PATENT-4 138 677 Not available NTIS
Department of the Army Washington DC
Acceleration Filter For Slowdown Discrimination.
Patent,
Robert O. Sinclair, Jr. Filed 6 Jan 66, patented 6 Feb 79, 6p AD-D006 341/2, PAT-APPL-519 164
Supersedes PAT-APPL-519 164-66.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A circuit for determining the acceleration of an object being tracked by a Doppler radar, wherein a part of the received signal is delayed and then subtracted from the received signal to produce a first signal; a portion of the delayed signal is further delayed and then subtracted from the delayed signal to produce a second signal; and the first and second signals are subtracted to produce a signal representative of the acceleration of the object being tracked by the CW Doppler radar. (Author)

PATENT-4 163 973 Not available NTIS
Department of the Air Force Washington DC
Means for Developing a Radar Tracking Error Signal.
Patent,
Robert E. Jacobson, Jr. Filed 18 Feb 75, patented 7 Aug 79, 4p AD-D006 316/4, PAT-APPL-549 402
Supersedes PAT-APPL-549 402-75.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A tracking radar error signal, that is independent of pulse to pulse variations of amplitude of the received signal, is derived by combining separately detected sum signal energy and difference signal energy in a manner that provides composite error signal pulses that are one-half sum signal energy and one-half sum plus difference signal energy. The pulse composition is realized by means of an RF switch that interrupts the difference signal during approximately one-half of each pulse period. The composite error signal is detected by an IF logarithmic detector and subsequently processed by two parallel box car generators. One box car generator is gated to process sum signal energy and the other is gated to process sum plus difference signal energy. The tracking error signal is obtained from a single pulse by feeding the outputs of the two box car generators to a differential amplifier and obtaining the difference voltage at its output. (Author)

18. NUCLEAR SCIENCES AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

LA-7862-MS PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Experiments on the ZT-S Reversed-Field Pinch, August–December 1978.
A. R. Jacobson. Jun 79, 42p
Contract W-7405-ENG-36

During the latter half of 1978 the ZT-S reversed-field pinch was used to explore the utility of pitch-programming techniques in setting up stable diffuse pinch profiles. Several experimental observations relating to this goal are presented. (ERA citation 04:050893)

N79-32101/4 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
On Steady Operation of Field Reversed Configurations.
K. Ikuta. Jun 79, 14p IPPJ-400

A method of sustaining toroidal current by the use of energetic ions in field reversed mirror configuration is considered. Since no charge-neutralizer is required in this method, the reactor system will be drastically simplified.

PPPL-1548 PC **A03**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Use of Yttrium for the Recovery of Tritium from Lithium at Low Concentrations.
R. E. Buxbaum, and E. F. Johnson. Jun 79, 28p
Contract EY-76-C-02-3073

A particularly difficult problem for first generation fusion power reactor systems is the recovery of tritium at very low concentration levels from the reactor blanket when lithium metal is the principal tritium breeding medium. On the basis of recent data and reasonable extrapolations, we show that it is likely that yttrium metal can be used to extract tritium from lithium at concentrations as low as 10 exp -6 atom fraction tritium in lithium under conditions that are practicable for commercial power machines. (ERA citation 04:050902)

UCRL-15043 PC **A04**/MF **A01**
General Dynamics, San Diego, CA. Convair Div.
Structural Stability Analysis for the Mirror Fusion Test Facility (MFTF) Jacket Assembly.
G. W. Smith. May 79, 55p GDC-LLL-79-003
Contract W-7405-ENG-48

A structural analysis was performed for the unsupported MFTF jacket assembly. The STAGS (Structural Analysis of General Shells) computer code was used to obtain linear and bifurcation buckling data for a one-quarter model considering all possible combinations of boundary conditions. The primary results are summarized. (ERA citation 04:050894)

UCRL-81537 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Electrostatics, Small Particles, and Laser Fusion Targets.
C. D. Hendricks. 26 Sep 78, 22p CONF-7811125-1
Contract W-7405-ENG-48
Institute of electrostatics meeting, Tokyo, Japan, 26 Nov 1978, Portions of document are illegible.

The success of any Inertial Confinement Fusion system for the production of useful power depends critically on the production of suitable targets. This is true whether the arrangement is that proposed by Nuckolls et al. or some other arrangement. The target must have characteristics such as material composition, structure, and surface finish which are tailored to the laser pulse length, energy, peak and average power and pulse shape. To provide useful power on a continuous basis, it is likely that the repetition rate will be 1.0 to 10 per second. Thus, in a 24 hour running period 864,000 targets may be necessary and one must be placed at the focal point of the laser every tenth of a second. For economic operation it is necessary that the targets be produced at costs of less than $1.00 per target. (ERA citation 04:050907)

18B. Isotopes

CONF-790602-70 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Nondestructive Assay Technique for exp 233 U and exp 235 U in Mixed Samples.
S. R. McNeany, and E. J. Allen. 1979, 7p
Contract W-7405-ENG-26
ANS annual meeting, Atlanta, GA, USA, 3 Jun 1979.

Individual fissile isotopes in small samples of mixed exp 233 U and exp 235 U can be determined using thermal neutron interrogation with delayed and prompt neutron detection. The technique is rapid (< 10 min.), nondestructive, and can obtain precisions of 1%. (ERA citation 04:048957)

18C. Nuclear Explosions

AD-A074 371/6 PC **A06**/MF **A01**
Systems Science and Software La Jolla CA
Hydrogen, Oxygen, Water Steam Generator.
Final rept. 18 Mar 77-15 Oct 78,
Peter Lagus. 15 Oct 78, 108p.p SSS-R-79-3813, DNA-4733F, AD-E300 583
Contract DNA001-77-C-0188

A prototype hydrogen, oxygen, water steam generating system has been developed. The system has been used to generate a modest amount of data relating to steam propagation through a packed sand column. A much larger capacity steam generating system based on the work completed appears to be possible.

USGS-474-306 PC **A03**/MF **A01**
Geological Survey, Denver, CO.
Bibliography of Reports by US Geological Survey Personnel on the Nevada Test Site and Related Subjects, July 1, 1977--December 31, 1978, with Author and Subject Indexes.
V. M. Glanzman. Jul 79, 30p
Contracts EY-76-A-08-0474, EW-78-A-08-154

This bibliography presents reports released to the public between July 1, 1977, and December 31, 1978, by personnel of the US Geological Survey. Reports include information on underground nuclear testing, waste management projects, the Nevada Test Site (NTS), and related subjects. Reports are listed by publication categories. Most reports are available to the public through the NTIS. Book publications of the US Geological Survey may be obtained from Branch of Distribution, US Geological Survey. 4 figures. (ERA citation 04:050636)

18D. Nuclear Instrumentation

LA-7408-C PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Industrial Workshop on LASL Semiconductor Radiation-Detector Research and Development.
M. Endebrock. Nov 78, 35p CONF-7705176-
Contract W-7405-ENG-36
Industrial workshop on LASL semiconductor radiation detector research and development, Los Alamos, NM, USA, 19 May 1977.

An Industrial Workshop on LASL Semiconductor Radiation Detector Research and Development was held at the Los Alamos Scientific Laboratory (LASL) in the spring of 1977. The purpose was to initiate communication between our detector research and development program and industry. LASL research programs were discussed with special emphasis on detector problems. Industrial needs and capabilities in detector research and development were also presented. Questions of technology transfer were addressed. The notes presented here are meant to be informal, as were the presentations. (ERA citation 04:050530)

LA-7890-C PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
ANL--LASL Workshop on Advanced Neutron Detection Systems.
T. A. Kitchens. Jun 79, 18p
Contract W-7405-ENG-36

A two-day workshop on advanced neutron detectors and associated electronics was held in Los Alamos on April 5--6, 1979, as a part of the Argonne National Laboratory--Los Alamos Scientific Laboratory Coordination on neutron scattering instrumentation. This report contains an account of the information presented and conclusions drawn at the workshop. (ERA citation 04:050531)

NUREG/CR-0598 PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
On-Site Inspection Procedures for SNM Doorway Monitors,
Paul E. Fehlau, Thomas E. Sampson, Carl N. Henry, John M. Bieri, and William H. Chambers. Oct 79, 48p LA-7646
Contract W-7405-eng-36

This report discusses a program to develop inspection techniques for performance of special nuclear material (SNM) doorway monitors installed at Nuclear Regulatory Commission licensed facilities. The program included a review of performance requirements, a compilation of data on commercially available SNM monitors, the proposal of an inspection scheme, and trial inspections.

PAT-APPL-937 909 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Metal Nitride Oxide Semiconductor (MNOS) Dosimeter.
Patent Application,
Ronald G. Fraass. Filed 29 Aug 78, 19p AD-D006 313/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention addresses itself to a radiation dosimeter which relies upon the unique characteristics of an MNOS device for absorbing ionizing radiation and measuring the level of the dose administered. This dosimeter is capable of accurately and repeatably measuring high levels of ionizing radiation produced by sources of x-rays, gamma rays, or high energy E-beams by monitoring the electrical performance characteristics of the MNOS device. When used in the manner taught, the device responds to total dose, unaffected by the rate at which the dose is administered. An MNOS transistor of an non-stepped gate configuration is subjected to a saturating electrical voltage between its gate and substrate connections of sufficient magnitude and duration to produce a stored charge in the gate structure. When the device has undergone charging and is not being irradiated the trapped charge remains for a relatively long period of time, decaying at a consistent and measurable rate. Upon being subjected to ionizing radiation the rate at which the charge dissipates increases significantly. The difference between the magnitude of residual charge with and without ionizing radiation is functionally related to the total radiation dose administered to the MNOS device. (Author)

18E. Nuclear Power Plants

DOE/ET-0030/2(79) PC **A03**/MF **A01**
Department of Energy, Washington, DC. Div. of Nuclear Power Development.
U.S. Central Station Nuclear Electric Generating Units: Significant Milestones (Status as of April 1, 1979).
Jun 79, 33p

Construction and operational milestones are tabulated for U.S. nuclear power plants. Data are presented on nuclear steam supply system orders. (ERA citation 04:049865)

DOE/ET-0089 PC **A14**/MF **A01**
Department of Energy, Washington, DC. Office of Nuclear Energy Programs.
Fission Energy Program of the U.S. Department of Energy. FY 1980.
Apr 79, 315p

This document presents the baseline implementation program plan as of January 1979 and is derived from the National Energy Plan and other major policy documents. The document discusses civilian nuclear power development, the policy for which has been established by the National Energy Plan of April 1977 and the National Energy Act of 1978. It derives the fission energy policy and program objectives from the National Energy Plan and Act, describes the overall program strategy, and presents the overall budget. The approach used in managing the program, including the program structure and methods used for program control, is explained. The civilian fission power development implementation programs are described in detail. Other considerations affecting civilian nuclear power development are also discussed. (ERA citation 04:048544)

EPRI-NP-1014(V.11) PC **A22**/MF **A01**
Bechtel, Inc., San Francisco, CA.
Pool-Type LMFBR Plant 1000 MWe Phase A-Extension-2 Design. Part XIII: Balance of Plant - Evaluation of Pool-Related Areas. Final Report.
Jun 79, 525p

The supportive studies carried out in Phase A and its extensions investigated specific areas where practical solutions or procedures are considered essential prerequisites for subsequent design. Those areas identified for each phase of the work are summarized and described in detail along with significant conclusions reached. (ERA citation 04:048632)

EPRI-NP-1014(V.9) PC **A12**/MF **A01**
Bechtel, Inc., San Francisco, CA.
Pool-Type LMFBR Plant 1000 MWe Phase A-Extension-2 Design. Part XII: Balance of Plant--Plant Description. Final Report.
Jun 79, 262p

The Bechtel-developed BOP conceptual design, which combines the work of Phase A and its extensions, is described. The overall plant, structures, and systems of a 1000 MWe (gross) LMFBR utilizing the pool concept and the saturated steam cycle adopted in Phase II, are described. Particular attention is directed to the description of features unique to the pool concept, and to incorporating the results of the special studies done in Phase A and Extensions 1 and 2. (ERA citation 04:048630)

GA-A-15405 PC **A05**/MF **A01**
General Atomic Co., San Diego, CA.
HTGR Process Heat Program Design and Analysis. Semiannual Progress Report, October 1, 1978--March 31, 1979.
Jul 79, 78p
Contract EY-76-C-03-0167-061

This report summarizes the semiannual FY-79 results of the concept design studies at General Atomic Company (GA) for an 842-MW(t) VHTR utilizing an intermediate helium heat transfer loop to provide thermal energy for the production of reducing gas (H sub 2 + CO) by steam-reforming of a light hydrocarbon. Basic carbon sources may be coal, residual oil, or oil shale. The report summarizes the conceptual design tasks conducted on the intermediate heat exchanger, reformer, and steam generator. The status of performance/optimization code development and the safety evaluation studies presently under way are reported. The completion of the milestones concerning the Plant Technical Description and the VHTR balance of plant cost is also reported. (ERA citation 04:049950)

NUREG/CR-0973 PC **A08**/MF **A01**
Washington Univ., Seattle. Program in Social Management of Technology.
Social and Economic Impacts of the Trojan Nuclear Power Plant: A Confirmatory Technology Assessment.
Technical rept.,
E. Wenk, Jr., P. L. Bereano, J. Douglass, R. H. Watson, and G. M. Zemansky. Oct 79, 161p

The Trojan nuclear plant located 32 miles northwest of Portland, Oregon was chosen for a case study. A background of the physical, demographic, economic, and political context of the communities is provided. This is followed by an evaluation of the impacts of plant construction and operation including local taxation, employment, business activity and income, demography, public utilities and transportation, land use, housing, recreation, culture and lifestyle, public safety, education, health care, and politics and institutions.

NUREG-0501 PC **A99**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
Seabrook Alternative Site Study: NRC Staff Testimony Related to Alternative Sites to Seabrook Units 1 and 2, Public Service Company of New Hampshire. Docket Nos. 50-443 and 50-444.
Dec 78, 987p

The NRC staff was ordered by the Atomic Safety and Licensing Appeal Board to reexamine the question of alternative sites for the Seabrook Station because the Staff's previous analysis was incomplete. Lacking was a comparison of Seabrook with cooling towers to alternative sites with appropriate cooling systems. The Staff's testimony presented in NUREG-0501 is intended to correct the deficiencies and to complete the record insofar as

alternative sites are concerned. There were 19 sites in the original slate which were compared to Seabrook with once-through cooling and the Staff was ordered to consider three southern New England sites. After coarse screening by the Staff, there remained nine sites which required detailed scrutiny. The nine surviving sites were: Seabrook, Lamprey Pond, Litchfield, Moore Pond, Shelburne and Montague - all in New Hampshire; Phillips Cove, Maine; Pilgrim, Massachusetts, and Millstone in Connecticut. No site was found to be obviously superior to Seabrook; however, one site, Phillips Cove, was found to be marginally superior, although not significantly enough to warrant additional consideration.

PB80-101520 PC **A04**/MF **A01**
California Univ., Richmond. Earthquake Engineering Research Center.
Soil Structure Interaction in Different Seismic Environments,
Alberto Gomez-Masso, John Lysmer, Jian-Chu Chen, and H. Bolton Seed. Aug 79, 57p UCB/EERC-79/18, NSF/RA-790240
Grant NSF-ENV76-23277

The current strong interest in nuclear power and the concerns regarding the seismic safety of the facilities involved has generated the development of improved methods of seismic soil-structure interaction analysis. Presented is a plane-strain method for soil-structure interaction analysis consisting of the superposition of the free field motions and the interaction motions, in a generalized seismic environment. The free field is modeled as a horizontally layered viscoelastic medium and the seismic environment may consist of a combination of S, P and Rayleigh waves. The soil-structure system is modeled with viscoelastic finite elements, transmitting boundaries viscous boundaries, and a 3-dimensional simulation. Comparative analyses of the same structure are conducted for an input of R waves and for vertically propagating S and P waves in a rock site and sand site. In the rock site the R waves produce higher peak horizontal spectral acceleration up to 25% and a significant rocking effect at points away from the center of gravity of the structure. However, the S and P waves show a higher peak vertical spectral acceleration by up to 15% at the center of the structure. Very similar horizontal response, but higher vertical response only at the center of the structure for S and P waves, are obtained for the sand site.

WAPD-MRP-151 PC **A03**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Shippingport Atomic Power Station (PWR). Technical Progress Report, July 26, 1978--January 25, 1979.
1979, 45p
Contract EY-76-C-11-0014

The Shippingport Atomic Power Station was operated with the Light Water Breeder Reactor core at high power levels (base load) until the planned maintenance shutdown from September 15 to October 7, 1978. After returning to power operation, the station was operated in a combination base-load-swingload mode to demonstrate load follow capability of the LWBR core. Evaluation of the core test data taken during the shutdown and during core power operations continues to show that the core is operating in accordance with design predictions. During the periods of power operation only routine corrective and periodic maintenance was required to maintain the operational readiness of the plant. At the end of this report period, the LWBR core had accumulated 9440 EFPH. (ERA citation 04:048565)

18F. Radiation Shielding and Protection

GEFR-SP-171 PC **A02**/MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.
Response of Secondary Containment to Presence of Sodium and Hydrogen.
E. L. Gleikler, and T. C. Huang. Jul 79, 15p
CONF-790810-2
Contract EY-76-C-03-0893
International seminar on containment of fast breeder reactors, Berlin, F.R. Germany, 9 Aug 1979.

As part of an effort to demonstrate that the risk to the public from extremely low probability events in liquid metal fast breeder reactors is bound within an acceptable envelope, containment pressurization by sodium and hydrogen was evaluated. Temperature and pressure histories are presented for typical sodium spray and pool fires and sodium vapor reactions. A review of mechanisms for hydrogen generation and recombination as well as limit for flammability and autocatalytic recombination is provided, and general containment design options to reduce risk are discussed. (ERA citation 04:050044)

HEDL-TME-78-105 PC **A03**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Thermal Analysis of a One-Element PWR Spent Fuel Shipping Cask.
S. R. Fields. Jun 79, 49p
Contract EY-76-C-14-2170

The transient thermal behavior of a typical one-element PWR spent fuel shipping cask, following a hypothetical accident and fire, has been simulated. The objectives of the study were to determine the transient behavior of the cask and its spent fuel primary coolant through the pressure relief system and possible fuel pin clad failure due to overheating following loss of coolant. 15 figures, 7 tables. (ERA citation 04:048996)

NUREG/CR-0924 PC **A08**/MF **A01**
Sandia Labs., Albuquerque, NM.
A Computerized Transportation Model for the NRC Physical Protection Project, Versions I and II.
Technical rept.,
G. M. Anderson. Aug 79, 171p SAND-78-8177
Prepared by ORINCON Corp., La Jolla, CA.

Details on two versions of a computerized model for the transportation system of the NRC Physical Protection Project are presented. The Version I model permits scheduling of all types of transport units associated with a truck fleet, including truck trailers, truck tractors, escort vehicles and crews. A fixed-fleet itinerary construction process is used in which iterations on fleet size are required until the service requirements are satisfied. The Version II model adds an aircraft mode capability and provides for a more efficient non-fixed-fleet itinerary generation process. Test results using both versions are included.

NUREG/CR-0925 PC **A06**/MF **A01**
Sandia Labs., Albuquerque, NM.
Development of a Transport Network Model for the NRC Physical Protection Projects.
Technical rept.,
G. M. Anderson, and H. J. Payne. Aug 79, 122p
SAND-78-8178
Prepared by ORINCON Corp., La Jolla, CA.

The assessment of the requirements for a transportation system to transport special nuclear materials, due to the complexities deriving from schedule size and flexibility, convoy components and maintenance requirements, requires a well-formulated model and an associated computer package not presently available. The report details the problem of sizing the transportation system, presents several approaches to modeling this system, and provides recommendations for development of a computerized model.

NUREG/CR-1084 PC **A03**/MF **A01**
Battelle Columbus Labs., OH.
Aerosol Measurements and Modeling for Fast Reactor Safety.
Quarterly progress rept. 1 Oct-31 Dec 78,
J. A. Gieseke, L. W. Lee, and H. Jordan. Oct 79, 38p BMI-2024
Contract NRC-04-76-293-07
See also report dated Feb 79, PB-292 778.

Technical progress during the quarter is described on the HAARM-3 computer code calculations and related subjects. The HAARM-3 calculation results for the postulated accident as specified by the Committee on the Safety of Nuclear Installations are presented. Included also are the results of parametric studies with HAARM-3 on the geometry of Nuclear Safety Pilot Plant, and the progress in formulating a procedure for validating the HAARM-3 code.

NUREG-0383-V-1-REV-2
PC **A13**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Material Safety and Safeguards.
Directory of Certificates of Compliance for Radioactive Materials Packages. Volume I. Summary Report of NRC Approved Packages (Revision 2).
Oct 79, 286p
See also Volume 1, Revision 1, PB-294-059.

This directory contains a Summary Report of NRC Approved Packages (Vol. 1) and all Certificates of Compliance (Vol. 2) for radioactive material packages effective September 14, 1979. The purpose of this directory is to make available a convenient source of information on packagings which have been approved by the U.S. Nuclear Regulatory commission. To assist in identifying packaging, an index by Model Number and corresponding Certificate of Compliance number is included at the back of each volume of the directory. The Summary Report includes a listing of all users of each package design prior to the publication date of the directory.

NUREG-0383-V-2-REV-2
PC **A09**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Material Safety and Safeguards.
Directory of Certificates of Compliance for Radioactive Materials Packages. Volume II. Certificates of Compliance (Revision 2).
Oct 79, 675p
See also Volume 2, Revision 1, PB-294 318.

This directory contains a Summary Report of NRC Approved Packages (Vol. 1) and all Certificates of Compliance (Vol. 2) for radioactive material packages effective September 14, 1979. The purpose of this directory is to make available a convenient source of information on packagings which have been approved by the U.S. Nuclear Regulatory Commission. To assist in identifying packaging, an index by Model Number and corresponding Certificate of Compliance number is included at the back of each volume of the directory. The Summary Report includes a listing of all users of each package design prior to the publication date of the directory.

ORNL/TM-6807 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
BREESE-II: Auxiliary Routines for Implementing the Albedo Option in the MORSE Monte Carlo Code.
V. R. Cain, and M. B. Emmett. Jul 79, 37p
Contract W-7405-ENG-26

The routines in the BREESE package implement the albedo option in the MORSE Monte Carlo Code by providing (1) replacements for the default routines ALBIN and ALBDO in the MORSE Code, (2) an estimating routine ALBDOE compatible with the SAMBO package in MORSE, and (3) a separate program that writes a tape of albedo data in the proper format for ALBIN. These extensions of the package initially reported in 1974 were performed jointly by ORNL, Bechtel Power Corporation, and Science Applications, Inc. The first version of BREESE had a fixed number of outgoing polar angles and the number of outgoing azimuthal angles was a function of the value of the outgoing polar angle only. An examination of differential albedo data led to this modified version which allows the number of outgoing polar angles to be dependent upon the value of the incoming polar angle and the number of outgoing azimuthal angles to be a function of the value of both incoming and outgoing polar angles. (ERA citation 04:050803)

PNL-2260-10 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Study of Plutonium Oxide Leak Rates from Shipping Containers. Quarterly Progress Report, January 1--March 30, 1979.
L. C. Schwendiman, W. J. Madia, J. Mishima, S. L. Sutter, and P. C. Owzarski. May 79, 41p
Contract EY-76-C-06-1830

The study was initiated in October 1976, as outlined in the 189 research proposal submitted previ-

ously. Several tasks are to be undertaken in this study which, when combined, have the end objective of defining the leak rates of plutonium oxide powder from characterized leaks. Progress during the reporting period is briefly described on the following tasks: review of the literature and theoretical work relating to transmission of particles through channels; investigation of the relationship of gas flow rates, leak geometries, pressure and temperatures; measurement of the transmission of a well-characterized simulant (UO sub 2 powder) through leaks characterized in Task B; measurement of the fuel grade PuO sub 2 leaks through a standard leak incorporated into a suitable container; and investigation of PuO sub 2 leaks through simulated defected containers. (ERA citation 04:048998)

TREE-1356 PC **A04**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Fire Test of DOT 7A Boxes.
J. D. Jensen. May 79, 61p
Contract EY-76-C-07-1570

The primary objective of conducting the full-scale fire tests of the DOT (Department of Transportation) 7A FRP Boxes was to provide information to assist in quantifying the fire hazard of the storage located at the Radioactive Waste Management Complex (RWMC), and to learn if changing the storage array will decrease the fire risk. Also, the level of fire fighting and fire protection required to maintain the risk at the RWMC within acceptable DOE guidelines was investigated. Two full-scale fire tests were conducted at Southwest Research Institute (SwRI) in June 1978, using the DOE 7A FRP Plywood Storage Containers. The fire tests showed that when subjected to a substantial ignition source, the boxes will propagate fire as long as no fire-suppression measures are taken. Fire will breach the boxes and spread the radioactive contaminated waste if it is not extinguished. As the fire progresses, additional boxes will become involved, and eventually the entire storage array will ignite. It is recommended that the use of DOT 7A Boxes be discontinued and replaced with noncombustible storage containers. In the event this is not practicable, guidance recommendations are presented to minimize the large fire loss potential. It is also recommended that an investigation be conducted into the number of boxes that can be destroyed and still maintain a safe environment for employees and the public. This investigation should include how far radioactive contamination will spread, what cleanup will be required, anticipated exposure of the people within the area, and the public impact of such a fire. (ERA citation 04:049573)

UCID-18229 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Chapman--Enskog Approach to Flux-Limited Diffusion Theory.
C. D. Levermore. 30 Jul 79, 19p
Contract W-7405-ENG-48

Using the technique developed by Chapman and Enskog for deriving the Navier--Stokes equations from the Boltzmann equation, a framework is set up for deriving diffusion theories from the transport equation. The procedure is first applied to give a derivation of isotropic diffusion theory and then of a completely new theory which is naturally flux-limited. This new flux-limited diffusion theory is then compared with asymptotic diffusion theory. (ERA citation 04:050804)

UCRL-50400(V.17)(Pt.F) PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
DOWNER (Version 79-1): Group Collapse Cross Section and Transfer Matrices.
D. E. Cullen. Jan 79, 49p
Contract W-7405-ENG-48

FORTRAN-callable subroutines are provided to allow a user to group-collapse cross sections and/or transfer matrices from any arbitrary initial group structure to any arbitrary final group structure. 3 figures. (ERA citation 04:050805)

UCRL-82435 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Analytical and Experimental Mark I Boiling Water Reactor Containment Safety Research at the Lawrence Livermore Laboratory.
E. W. McCauley. 1 Mar 79, 17p CONF-790802-19
Contract W-7405-ENG-48
International conference on structural mechanics in reactor technology, Berlin, F.R. Germany, 13 Aug 1979.

An overview of research work is discussed which addresses both large scale experimental and multidimensional analytical containment studies conducted at the Lawrence Livermore Laboratory since 1976. The Mark I Boiling Reactor (BWR) containment design is the subject of interest. In the experimental program, particular focus is placed on quantification of loss-of-coolant-accident (LOCA) induced loads. The focus of the analytical effort is toward understanding of fluid/structure interaction effects due both to LOCA induced loads and safety relief value (SRV) loads in the Mark I BWR pressure suppression wetwell (a segmented torus). (ERA citation 04:048718)

WAPD-TM-1404 PC **A05**/MF **A01**
Bettis Atomic Power Lab., West Mifflin, PA.
Ex-Reactor Deformation of Externally Pressurized Short Lengths of Fuel Rod Cladding. LWBR Development Program.
I. A. Selsley. May 79, 80p
Contract EY-76-C-11-0014

The DECAG (Deformation of Cladding into Axial Gaps) ex-reactor test program evaluated deformation of Zircaloy-4 cladding into axial gaps in tubular fuel elements. These axial gaps are the result of cladding elongation and fuel stack shrinkage. The test program consisted of twelve series and subseries of both fully recrystallized and stress-relieved highly cold worked tubing tested under pressure-temperature combinations in autoclaves. The test program also verified the validity of achieving test acceleration through the use of elevated temperatures by correlating both ovality and diameter change at lower temperatures with the Larson--Miller Parameter. (ERA citation 04:049935)

18G. Radioactive Wastes and Fission Products

ANL-78-68 PC **A12**/MF **A01**
Argonne National Lab., IL.
Chemical Engineering Division Fuel Cycle Programs. Progress Report, January--March 1978.
M. J. Steindler, M. Ader, and R. E. Barletta. Apr 79, 254p
Contract W-31-109-ENG-38

Fuel cycle studies reported for this period include studies of advanced solvent extraction techniques focussed on the development of centrifugal contactors for use in Purex processes. Miniature single-stage and eight-stage centrifugal contactors are being employed in studies of contactor performance and the kinetics of extraction. A 9-cm-ID centrifugal contactor has been completed, and fabrication drawings are being prepared for a plant-scale contactor. In other work, tricaprylmethyl-ammonium nitrate and di-n-amyl n-amylphosphonate are being evaluated as extractants in the Thorex process. Literature on the dispersion of liquids by explosions is being reviewed. A process was developed for extracting TBP degradation products from TBP-Na sub 2 CO sub 3 scrub solutions while the actinides remain with the raffinate. In the program on pyrochemical and dry processing of nuclear fuel, the literature is being reviewed for acceptable materials for containment vessels, decladding methods are being evaluated, salt transport processes are being studied, a candidate flow sheet (based upon the Dow Aluminum Pyrometallurgical process) for reprocessing spent uranium metal fuel was prepared, work was begun on the use of molten salts for reprocessing actinide oxides, and the reprocessing of (Th,U)O sub 2 solid solution in a KCl-LiCl salt containing ThCl sub 4 and thorium chips was studied. Work on the encapsulation of solidified radioactive waste in a metal matrix includes study of (1) chemical interactions between simulated waste forms and matrix metals, (2) the leech rates of simulated encapsulated waste forms, and (3) the corrosion of candidate matrix metals and canister materials in brine solutions.Work to establish criteria for the handling of waste cladding hulls is continuing. The transport properties of nuclear waste in geologic media are being studied to estimate leaching of radionuclides from deep repositories by groundwater. (ERA citation 04:049536)

ANL-79-25 PC **A03**/MF **A01**
Argonne National Lab., IL.
ARDISC (Argonne Dispersion Code): Computer Programs to Calculate the Distribution of Trace Element Migration in Partially Equilibrating Media.
R. Strickert, A. M. Friedman, and S. Fried. Apr 79, 26p
Contract W-31-109-ENG-38

A computer program (ARDISC, the Argonne Dispersion Code) is described which simulates the migration of nuclides in porous media and includes first order kinetic effects on the retention constants. The code allows for different absorption and desorption rates and solves the coupled migration equations by arithmetic reiterations. Input data needed are the absorption and desorption rates, equilibrium surface absorption coefficients, flow rates and volumes, and media porosities. (ERA citation 04:048204)

CONF-790711-3 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Shallow Land Burial: Experience and Developments at Oak Ridge National Laboratory.
T. Tamura, T. E. Cerling, L. D. Eyman, D. D. Huff, and B. P. Spalding. 1979, 5p
Contract W-7405-ENG-26
International symposium on underground disposal of radioactive wastes, Otaniemi, Finland, 2 Jul 1979.

At ORNL both liquid and solid wastes have been disposed of in the local Conasauga shale formation since 1943. exp 90 Sr is being released to White Oak Creek from the disposal areas. The hydrology and geology of the disposal sites are being studied. Field studies are being conducted to reduce infiltration of rain into the solid waste trenches. (ERA citation 04:049555)

CONF-790822-6 PC **A03**/MF **A01**
Allied Chemical Corp., Idaho Falls, ID.
Analysis of Environmental Effects from Disposal of Solidified ICPP High-Level Wastes.
N. A. Chipman, G. G. Simpson, H. Lawroski, W. A. Rodger, and R. L. Frendberg. 1979, 48p
Contract EY-76-C-07-1570
87. AICHE national meeting, Boston, MA, USA, 19 Aug 1979.

This work is part of a comprehensive study to assess possible environmental impacts from six different options for managing high-level defense wastes generated at the ICPP. Only radiological consequences are considered in this report; population doses to those within 80 km of ICPP were estimated for time periods up to 100 million years. The population dose to future generations from any option is insignificant compared with that from natural background radiation: less than 1 cancer death in 1,000 years compared with 20,000 cancer deaths from natural background radiation. 16 tables. (ERA citation 04:048205)

DOE/EV-0005/3(Rev.) PC **A13**/MF **A01**
Department of Energy, Oak Ridge, TN. Oak Ridge Operations Office.
Formerly Utilized MED/AEC Sites Remedial Action Program. Radiological Survey of the Former VITRO Rare Metals Plant, Canonsburg, Pennsylvania. Final Report.
Jun 79, 296p
Contract W-7405-ENG-26

This 18-acre site was used from 1911 to 1922 to extract radium from carnotite ore, from 1930 to 1942 to extract radium and uranium salts from onsite residues and carnotite ore, and from 1942 to 1957 to recover uranium from various ores and scrap materials. The radiological survey was conducted in two phases, Phase I included measurement of radon and radon daughter concentrations in onsite buildings; concentrations measured in this part of the survey were all above guideline levels. Phase II consisted of measurement of sur-

face contamination levels on the site, external gamma radiation levels at 1 m above surfaces on and near the site, radionuclide concentrations in surface and subsurface soil and water on and near the site, and radon concentrations in air at offsite locations. The results of the second phase of the survey indicate that large quantities of the radioactive wastes generated during radium and uranium recovery operations still remain on the site. Radium-bearing wastes are present in soil beneath or adjacent to each of the buildings on the site and in the top few feet of soil over almost the entire site, with some areas being contaminated to a depth of 16 ft or more. Alpha contamination levels, beta--gamma dose rates, and external gamma radiation levels in some areas of the buildings and outdoors on the site are above current federal guidelines concerning the release of property for unrestricted use. Concentrations of exp 226 Ra in water in holes drilled on the site are above the maximum permissible concentration (MPC/sub w/). Also, measurements made offsite show that contamination from the site has spread to nearby offsite locations, and that there is significant atmospheric transport of exp 222 Rn from the site. (ERA citation 04:049571)

DP-MS-78-100 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Transmutation of LWR Waste Actinides in Thermal Reactors.
T. C. Gorrell. 1979, 21p CONF-790602-49
Contract EY-76-C-09-0001
ANS annual meeting, Atlanta, GA, USA, 3 Jun 1979.

Recycle of actinides to a reactor for transmutation to fission products is being considered as a possible means of waste disposal. Actinide transmutation calculations were made for two irradiation options in a thermal (LWR) reactor. The cases considered were: all actinides recycled in regular uranium fuel assemblies, and transuranic actinides recycled in separate mixed oxide (MOX) assemblies. When all actinides were recycled in a uranium lattice, a reduction of 62% in the transuranic inventory was achieved after 10 recycles, compared to the inventory accumulated without recycle. When the transuranics from 2 regular uranium assemblies were combined with those recycled from a MOX assembly, the transuranic inventory was reduced 50% after 5 recycles. (ERA citation 04:048200)

DP-MS-78-90 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Compatibility Tests of Materials for a Prototype Ceramic Melter for Defense Glass-Waste Products.
G. G. Wicks. 1979, 12p CONF-790420-18
Contract EY-76-C-09-0001
International symposium on ceramics in nuclear waste management, Cincinnati, OH, USA, 30 Apr 1979.

Objective is to evaluate the corrosion/erosion resistance of melter materials. Materials tested were Monofrox K3 and E, Serv, Inconel 690, Pt, and SnO. Results show that Inconel 690 is the leading electrode material and Monofrox K3 the leading refractory candidate. Melter lifetime is estimated to be 2 to 5 years for defense waste. (ERA citation 04:048198)

DP-MS-78-97 PC **A02**/MF **A01**
Du Pont de Nemours (E.I.) and Co., Aiken, SC. Savannah River Lab.
Operation of a Pilot Incinerator for Solid Waste.
H. E. Hootman, D. J. Trapp, and J. H. Warren. 1979, 22p CONF-790602-73
Contract EY-76-C-09-0001
ANS annual meeting, Atlanta, GA, USA, 3 Jun 1979.

A laboratory-scale incinerator (0.5 kg waste/hr) was built and operated for more than 18 months as part of a program to adapt and confirm technology for incineration of Savannah River Plant solid wastes, which are contaminated with about 0.3 Ci/kg of alpha-emitting transuranium (TRU) nuclides (Slide 1). About 4000 packages of simulated nonradioactive wastes were burned, including HEPA (high-efficiency particulate air) filters, resins, and other types of solid combustible waste from plutonium finishing operations. Throughputs of more than 3 kg/hr for periods up to 4 hours were demonstrated. The incinerator was operated at temperatures above 750 exp 0 C for more than 7700 hours during a period of 12 months, for an overall availability of 88%. The incinerator was shut down three times during the year: once to replace the primary combustion chamber electrical heater, and twice to replace oxidized electrical connectors to the secondary chamber heaters. Practical experience with this pilot facility provided the design basis for the full-size (5 kg waste/hr) nonradioactive test incinerator, which began operation in March 1979. (ERA citation 04:048199)

EGG/PR/W-78-016 PC **A05**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Task Force Evaluation of TRU Waste Retrieval Methods. Final Report.
H. M. Burton, C. W. Bills, J. R. Fielding, J. S. Schofield, and J. L. Warren. Nov 78, 96p
Contract EY-76-C-07-1570

A task force review of the concepts for removal of buried TRU waste at INEL was performed at the request of the DOE. This task force, composed of members from outside the EG and G Waste Management Division, was selected for their particular expertise applicable to retrieval of buried TRU waste. The application of a figure-of-merit procedure to provide an orderly evaluation was selected. The conclusion of the task force was that the design concept submitted by FMC Corporation for a mechanized retrieval system has the highest potential of satisfying the requirements for safe removal of the 2.5 million ft exp 3 of buried waste before the year 2000 at a reasonable cost. Recommendations for further design improvements, investigative work, and studies are provided. 17 figures, 24 tables. (ERA citation 04:048206)

EPRI-NP-1087 PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Nuclear Waste Management Status and Recent Accomplishments. Final Report.
J. L. McElroy, and R. E. Burns. May 79, 86p
Contract EY-76-C-06-1830

The status and technical progress of nuclear waste disposal is reviewed with emphasis on technical and programmatic progress in High Level Nuclear Waste disposal technology during the 1976 to 1978 time period. Process steps in the waste solidification and geologic disposal system are described emphasizing processes and systems that are more advanced in terms of readiness for full-scale U.S. demonstration. Worldwide technical accomplishments in support of the reference US waste vitrification and geologic disposal approach are highlighted. (ERA citation 04:048190)

ICP-1182 PC **A02**/MF **A01**
Allied Chemical Corp., Idaho Falls, ID. Idaho Chemical Programs - Operations Office.
Experimental Mixer-Settler Actinide Partitioning from ICPP Acidic Wastes.
J. D. Baker, L. D. McIsaac, J. F. Krupa, D. H. Meikrantz, and N. C. Schroeder. Jun 79, 25p
Contract EY-76-C-07-1540

Experimental mixer-settler tests were performed to demonstrate the capability and utility of DHDECMP-based solvent extraction processes for partitioning +3, +4, and +6 actinides from ICPP acidic aqueous wastes. Experiments were completed using synthetic and actual first cycle waste. A single test on actual high sodium waste is also described. These experiments show the actinide elements can be separated from ICPP acidic aqueous waste types. The resultant solutions, after calcination, would yield alpha free (< 10 nCi/g) solid waste. 3 figures, 8 tables. (ERA citation 04:048201)

ICP-1186 PC **A03**/MF **A01**
Allied Chemical Corp., Idaho Falls, ID. Idaho Chemical Programs - Operations Office.
Sampling of Stored High-Level Radioactive Calcined Waste at ICPP.
A. G. Westra, J. S. Schofield, S. J. Horn, J. A. Hendricks, and G. S. Pomiak. May 79, 45p
Contract EY-76-C-07-1570

Equipment and procedures used to sample calcined solids stored in underground bins at the Idaho Chemical Processing Plant are described. The calcine sampling process basically consisted of driving a string of sample tubes into a calcine storage bin with a soil sampling drill rig, and withdrawing the sample tubes one at a time into a shielded sample cask located directly over the open calcine retrieval riser. Samples of both alumina and zirconia calcine were obtained and indicate that the calcine can be retrieved with a pneumatic retrieval nozzle. (ERA citation 04:049557)

ICP-1191 PC **A06**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Technical Quarterly Progress Report, October 1--December 31, 1978.
D. L. Plung. Apr 79, 117p
Contract EY-76-C-07-1540

Special Materials Production: Results are reported on work done on long-term management of ICPP high-level wastes, ICPP process improvements, advanced graphite reprocessing, ICPP waste management development, technical support to the NWCF, effluent monitoring methods evaluation and development, and technical program improvement. Fuel Cycle Research and Development: Work on the fluidized-bed calcination and posttreatment of commercial waste focused on the study of bidentate compounds for separation of actinides from commercial LWR reprocessing wastes. In the krypton-85 storage development program, work concentrated on process and storage development, zeolite encapsulation, and the long-term testing of krypton storage media. Results are also reported on work done as part of the HTGR fuel reprocessing program. Other Projects Supporting Energy Development: Results from the nuclear materials security program include work on the materials control test and evaluation system, sensor and instrument development, and on the portable mass spectrometer development. Results are also reported on the in-plant source term program and on the burnup methods for FBR fuels. Research on Westinghouse Electric Corporation and Power Burst Facility fuels is reported. Work on the spectrophotometric determination of uranium in organic solvents, calculator-controlled balance weighing and volumetric titration, calculator-controlled potentiometric titrations, analysis of glass surfaces by Auger Electron Spectrometry, and OKLO studies is reported. (ERA citation 04:048191)

ICP-1195 PC **A03**/MF **A01**
Allied Chemical Corp., Idaho Falls, ID. Idaho Chemical Programs - Operations Office.
Removal and Disposal of Radioactive Sludge from the Fuel Storage Basin at the Idaho Chemical Processing Plant.
G. W. Hoech, and D. W. Rhodes. Jun 79, 27p
Contract EY-76-C-07-1540

The fuel storage basin at the Idaho Chemical Processing Plant recently underwent an intensive cleanup program. A major part of this program consisted of removing a five-to-ten cm layer of sludge from the basin floor and a lesser amount from the walls. The techniques used to vacuum this sludge into a large storage tank and then transfer it from the storage tank to portable concrete storage vaults where it was solidified are described. The equipment used is also described in detail. Approximately 48,150 liters of sludge was removed and solidified for disposal at the Radioactive Waste Management Complex. (ERA citation 04:048207)

KSC-1006-1 PC **A08**/MF **A01**
Kaman Sciences Corp., Colorado Springs, CO.
Risk Analysis of a Spent Fuel Receiving and Storage Facility Using the GO Methodology. Final Report.
D. E. Wood, and N. J. Becar. 1 Mar 79, 152p
Contract EY-77-C-09-1006

The GO methodology has been successfully used to provide a comprehensive risk analysis of a spent fuel receiving and storage basin. As the facility was still in the conceptual design phase, the model was developed to emphasize material flows and functions rather than hardware. The multistate and interactive capability of GO was used to pro-

vide distributions of expected releases (instead of just single point values). Material flow through locations in the facility was modeled with release distributions determined for each section of the facility. Detailed risk plots are provided for some of the more significant potential releases. The expected values of the average annual potential releases from the facility are five orders of magnitude below the EPA proposed limits for the total fuel cycle of the 100 GWe of nuclear power that could be served by this facility. (ERA citation 04:048179)

LA-UR-79-1039 PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Shallow Land Burial: Experience and Developments at Oak Ridge and Los Alamos.
J. L. Warren. 1979, 35p CONF-790711-1
Contract W-7405-ENG-36
International symposium on underground disposal of radioactive wastes, Otaniemi, Finland, 2 Jul 1979.

Since the mid-1940's, in excess of 250,000 m exp 3 of low- and intermediate-level radioactive solid waste, generated in operations at the Los Alamos Scientific Laboratory (LASL), has been disposed of by on-site shallow land burial and retrievable storage in dry volcanic tuff. Guidelines have been developed at LASL which regulate the construction of waste disposal facilities, burial and storage operations, disposal site maintenance and restoration, and documentation of all waste disposal activities. Monitoring programs at the past and current solid waste disposal sites have continued to show that, with the exception of low levels of tritium, no migration of contaminants away from their disposal location has been detected. (ERA citation 04:048210)

LA-7674-MS PC **A03**/MF **A01**
Los Alamos Scientific Lab., NM.
Gas Generation from Radiolytic Attack of TRU-Contaminated Hydrogenous Waste.
A. Zerwekh. Jun 79, 29p
Contract W-7405-ENG-36

In 1970, the Waste Management and Transportation Division of the Atomic Energy Commission ordered a segregation of transuranic (TRU)-contaminated solid wastes. Those below a contamination level of 10 nCi/g could still be buried; those above had to be stored retrievably for 20 y. The possibility that alpha-radiolysis of hydrogenous materials might produce toxic, corrosive, and flammable gases in retrievably stored waste prompted an investigation of gas identities and generation rates in the laboratory and field. Typical waste mixtures were synthesized and contaminated for laboratory experiments, and drums of actual TRU-contaminated waste were instrumented for field testing. Several levels of contamination were studied, as well as pressure, temperature, and moisture effects. G (gas) values were determined for various waste matrices, and degradation products were examined. (ERA citation 04:048192)

LA-7775-PR PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Studies of Transuranic Waste Storage under Conditions Expected in the Waste Isolation Pilot Plant (WIPP). Progress Report, December 15, 1978--March 15, 1979.
S. T. Kosiewicz, B. L. Barraclough, and A. Zerwekh. May 79, 22p
Contract W-7405-ENG-36

Thermal decomposition of waste matrices currently appears to be less important than previously reported. Low dose-rate experiments (4 x 10 exp 5 nCi/g) are generating some gas, but not enough to permit quantification of the gas evolution rates. Some catalyzed thermal degradation may be occurring for polyethylene and cellulosics. The low-temperature and the low dose-rate experiments require additional prolonged exposure time because their gas evolution rates are so low. These experiments simulate most closely the conditions that real wastes would experience. WIPP lithostatic pressure (1.5 x 10 exp 4 kPa) on the solid waste is estimated to generate gas at 10 to 300% of the rate of similar but nonpressurized experiments. Experiments that are prepressurized to 1 x 10 exp 4 kPa deuterium show a decrease of 50 to 60% in the rate of hydrogen evolution. Self-pressurization up to 830 kPa by radiolytically evolved gases does not change the rate of additional gas production. Current data appear to indicate that radiolytic gas evolution rates may be dose-rate dependent. The rates of gas evolution by radiolysis are temperature dependent, but the magnitude of the effect diminishes with time. G(gas) for polyvinyl chloride is tentatively estimated to be 8 to 11 gas molecules per 100 eV. Thermogravimetric analyses of bitumen in air and nitrogen are reported. Additionally, the assessment and detailed characterization of the LASL TRU waste inventory has been completed and final data are presented. 6 figures, 9 tables. (ERA citation 04:048208)

LA-7788-PR PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Potential Microbial Impact on Transuranic Wastes under Conditions Expected in the Waste Isolation Pilot Plant (WIPP). Progress Report, October 1--December 15, 1978.
B. J. Barnhart, E. W. Campbell, J. M. Hardin, E. Martinez, and D. E. Caldwell. May 79, 21p
Contract W-7405-ENG-36

Since October 1, microorganisms were successfully enumerated in soil from an area adjacent to a shallow burial site (Area C) at the Los Alamos Scientific Laboratory. From 1.33 to 2.98 x 10 exp 6 aerobic colony forming units (CFU) were found per gram of soil as compared with 1.99 x 2.97 x 10 exp 3 anaerobic CFU per gram. The fungus population ranged from 3.5 x 10 exp 3 to 3.2 x 10 exp 4 CFU per gram. The most probable number (MPN) demonstrated in nutrient broth by the extinction dilution method was similar for aerobic and anaerobic bacteria. Direct counting of microflora in fluorescent-stained soil samples has been initiated using the epifluorescent microscopy capability at the University of New Mexico. It was demonstrated the almost quantitative methylation of mercury and attempts were made to alkylate europium in an abiotic reaction with methylcobalamine, a metabolic intermediate in bacterial metabolism, but methylation was not detected over a range of pH (4.0 to 7.0) and at two temperatures (25 exp 0 C and 37 exp 0 C). The alkylation of thorium is being pursued as a prerequisite to working with plutonium. Studies of europium citrate and europium EDTA chelate degradation have begun. Both degrade, but EDTA degrades at a much slower rate than citrate. Methodology has been improved in preparation for analogous studies of plutonium chelate degradation. The microbial production of gases under conditions expected for the WIPP has been studied. Carbon dioxide is the only significant gas detected. Hydrogen sulfide is also produced if a high concentration of proteinaceous substrate is present. (ERA citation 04:048209)

LA-7797-PR PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Fission Product Release. Progress Report, January 1--March 31, 1979.
E. A. Bryant. Apr 79, 19p ONWI/Sub-79/E511-01200-6
Contract W-7405-ENG-36

Leach experiments with samples of reactor fuel materal have been started. After 15 days of leaching there is a pattern of slower leaching from the fuel material in a reducing environment for all measured isotopes except exp 137 Cs. Dissolution rates of UO sub 2 also are found to be slower in a hydrogen atmosphere than in an oxygen atmosphere in experiments at 70 exp 0 C. Dissolution rates for ZrO sub 2 in the fluorite form are measured to be less than 10 exp -8 g/cm exp 2 day. (ERA citation 04:048180)

LBL-8570 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Rock Mass Characterization for Storage of Nuclear Waste in Granite.
P. A. Witherspoon, P. Nelson, T. Doe, R. Thorpe, and B. Paulsson. Feb 79, 39p SAC-18
Contract W-7405-ENG-48

The rock mass characterization in granite adjacent to an iron mine at Stripa, Sweden is being carried out by four different methods. The mechanical characterization includes monitoring the responses to thermal loading of jointed rock in situ, and mechanical tests on cores from 25 mm to 1 m in diameter. Geological characterization includes detailed surface mapping, subsurface mapping, and core mapping. Geophysical characterization uses a variety of borehole techniques, with emphasis on sonic methods. The hydrologic characterization is done through injection tests, pump tests, water pressure measurements, and controlled inflow tests to tunnels. Since the data are not yet complete, only tentative conclusions can be drawn regarding the best combinations of techniques for rock-mass characterization. Mapping studies are useful in defining continuity and fracture-system geometry. They do not give aperture, a factor significant in terms of both water flow and the displacements due to heating. Of the geophysical techniques, sonic methods appear most effective in fracture definition; other methods, gamma and neutron particularly, give data on radionuclide and water content and need further analysis with geologic and hydrologic data to determine their significance. Hydrologic work yields primarily aperture data, which with fracture geometry can be used to calculate directional permeabilities. Pressure measurements may provide one means of assessing fracture continuity. Finally, laboratory tests on large cores suggest considerable refinement in testing techniques may be needed before stress-aperture data can be extrapolated from laboratory to field. (ERA citation 04:048211)

MLM-2620 PC **A03**/MF **A01**
Mound Facility, Miamisburg, OH.
Tritium Waste Control: October--March 1979.
W. C. Shumay, Jr. 7 Jun 79, 34p
Contract EY-76-C-04-0053

Progress is reported in the following areas: catalytic exchange detritiation studies, electrolysis of tritiated water, effect of tritium radiation on Pt--C--Teflon catalysts, gas generation measurements on tritiated waste materials, fixation of aqueous tritiated waste in polymer impregnated concrete, and management of high specific activity liquid wastes. (ERA citation 04:048202)

MLM-2632 PC **A02**/MF **A01**
Mound Facility, Miamisburg, OH.
Development of a QA Program for Radioactive Waste Containers.
H. B. Kreider, Jr. 20 Jul 79, 10p
Contract EY-76-C-04-0053

The development of a quality assurance program covering the procurement of steel drums to be used for packaging radioactive waste material is presented. Problems created by the lack of, or incomplete, communication between the vendor and the buyer are discussed. The values of vendor surveys as part of the overall quality program are described. The results of this program indicate that a highly reliable quality container can be purchased at a minimal cost increase. (ERA citation 04:048193)

NUREG/CR-0936 PC **A04**/MF **A01**
Brookhaven National Lab., Upton, NY.
Recommendations for Meteorological Measurement Programs and Atmospheric Diffusion Prediction Methods for Use at Coastal Nuclear Reactor Sites,
Gilbert S. Raynor, Paul Michael, and S. SethuRaman. Oct 79, 68p BNL/NUREG-51045
Contract DOE-EY-76-C-02-0016

A study, based on a literature review, was performed to examine currently recommended meteorological measurement programs and diffusion prediction methods for nuclear power plants to determine their adequacy for plants located in coastal zones. Although procedures for handling the 'near worst' case (stable, light wind situation) were judged adequately conservative, deficiencies in guidelines and procedures were found with respect to the following: failure to consider the role of coastal internal boundary layers, specifications for tower locations and instrument heights, methods of classifying atmospheric stability, method of allowing credit for plume meander, and models specified for diffusion calculations. Recommendations were made for changes in the guidelines applicable to these topics. Areas in which additional research is needed were identified.

NUREG/CR-1137 PC **A07**/MF **A01**
Maryland Univ. at Baltimore. Radiation Safety Office.

Institutional Radioactive Wastes-1977.
Final rept. Aug 78-Sep 79,
Oct 79, 139p
See also report dated Mar 78, PB-279 582.

A followup survey to the 1975 institutional radioactive waste study was conducted to obtain data for the calendar year 1977. The survey population of large medical and academic licensees shipped an estimated 7,771 cu m of low level radwaste for burial in 1977. The fastest growing waste form produced by the population is waste liquid scintillation vials which have undergone a 60% increase in volume since 1975. The waste volume produced by the population appears to be increasing linearly, at approximately the same rate as low level radwastes in general.

NVO-196-10 PC **A04**/MF **A01**
Department of Energy, Las Vegas, NV. Nevada Operations Office.
Nevada Nuclear Waste Storage Investigations. Quarterly Report, January--March 1979.
May 79, 53p

The processing of weapons test ground motion acceleration data for Pahute Mesa events is 86% complete. The geology, hydrology, and geophysics of drill holes UE25a number 1 and UE25a number 3 were completed as draft reports. Preliminary analysis of the Calico Hills gravity data shows that the anomalous mass is coincident with the principal body producing the magnetic anomoly (inferred to be the intrusive at depth). Mapping of Quaternary deposits has been completed for the Calico Hills-Northern Jackass Flats area. Forty-one seismograph stations have been installed as part of the Southern Great Basin seismograph network. A fission track age of about 6 m.y. was obtained on zircon from a sample of rhyolitic lump pumice collected from beneath the basalt in southeastern Crater Flat. Power was turned off to the Eleana near-surface experiment. The heater and instrumentation system design for the tuff in-stu test was completed. Batch sorption measurements on Yiucca Mountain cores were highly favorable for the isotopes studied: exp 85 Sr, exp 137 Cs, exp 133 Ce, and exp 152 Eu. Petrological characterization of core samples from the Yucca Mountain drill hole was completed. Mining of the heater drifts and the railcar room was completed for the spent fuel test: Climax. Final design reviews for the spent fuel test handling system and canister, liners, shield plug, and electrical simulators were held. (ERA citation 04:049546)

ONWI-17 PC **A04**/MF **A01**
Brookins (Douglas G.), Albuquerque, NM.
Geochemical Constraints on Accumulation of Actinide Critical Masses from Stored Nuclear Waste in Natural Rock Repositories. Technical Report, April 1, 1978--August 31, 1978 (Plus Supplemental Time to December 31, 1978).
D. G. Brookins. 31 Dec 78, 75p
Contract EY-76-C-06-1830

Results of a literature search of abundant data on lanthanide and actinide individual and joint systematics are presented. Covered were several papers/reports about uranium solution chemistry, uranium deposits, a natural fission reactor, rare-earch deposits, manganese nodules, bedded and dome salt deposits, and miscellaneous items. This literature search is not complete but represents efforts of seven individuals attempting to gather data relevant to the objectives defined in this report. Many foreign articles, as well as many English language articles are absent. Approximately 800 articles were inspected; 69 are included in the References cited. The data search for actinides and lanthanides in natural rocks indicated that only limited segregation of the actinides U, Np, Pu, Am, and Cm from the lanthanides is possible should high-level waste be released from canisters stored in various geomedia. Supporting this were studies of Oklo and other uranium deposits, manganese nodules, monomineralic and concretion formation rates, and actinide and lathanide transport in brines. The fact that some waste canisters may, under certain conditions, contain several critical masses of one or more actinides is countered by the facts that (a) most actinides have very short half-lives and would decay before release from canisters, (b) released actinides and lanthanides, although dispersed, would be transported and deposited as a group, thus preventing point concentration of any actinides, and (c) exp 235 U has a much longer half-life than the other actinides, thus allowing greater time for possible reaccumulation and criticality; such a scenario would demand that exp 235 U be segregated effectively from other elements in the lanthanide-actinide groups.No mechanism to do this is consistent with the natural occurrences studied or the theoretical Eh-pH diagrams considered. (ERA citation 04:049559)

ONWI-9(1) PC **A12**/MF **A01**
Battelle Memorial Inst., Columbus, OH.
Office of Nuclear Waste Isolation. Technical Progress Report for the Quarter, October 1--December 31, 1978.
1979, 274p
Contract EY-76-C-06-1830

Progress is reported in the following areas: science and technology, process/equipment development, systems analysis, site identification, facilities engineering, and site and repository licensing. (ERA citation 04:049558)

ORNL/TM-6677 PC **A08**/MF **A01**
Oak Ridge National Lab., TN.
Integrated Assessmet of the Impacts Associated with Uranium Mining and Milling.
D. C. Parzyck, C. F. Baes, III, and L. G. Berry. Jul 79, 166p
Contract W-7405-ENG-26

The occupational health and safety impacts are assessed for domestic underground mining, open pit mining, and milling. Public health impacts are calculated for a population of 53,000 located within 88 km (55 miles) of a typical southwestern uranium mill. The collective annual dose would be 6.5 man-lung rem/year, 89% of which is from exp 222 Rn emitted from mill tailings. The dose to the United States population is estimated to be 6 x 10 exp 4 man-lung rem from combined mining and milling operations. This may be compared with 5.7 x 10 exp 5 man-lung rem from domestic use of natural gas and 4.4 x 10 exp 7 man-lung rem from building interiors. Unavoidable adverse environmental impacts appear to be severe in a 250 ha area surrounding a mill site but negligible in the entire potentially impacted area (500,000 ha). The contemporary uranium resource and supply industry and its institutional settings are described in relation to the socio-economic impacts likely to emerge from high levels of uranium mining and milling. Radon and radon daughter monitoring techniques associated with uranium mining and milling are discussed. (ERA citation 04:049572)

ORNL-5526 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Effects of Temperature, Temperature Gradients, Stress, and Irradiation on Migration of Brine Inclusions in a Salt Repository.
G. H. Jenks. Jul 79, 73p
Contract W-7405-ENG-26

Available experimental and theoretical information on brine migration in bedded salt are reviewed and analyzed. The effects of temperature, thermal gradients, stress, irradiation, and pressure in a salt repository are among the factors considered. The theoretical and experimental (with KCl) results of Anthony and Cline were used to correlate and explain the available data for rates of brine migration at temperatures up to 250 exp 0 C in naturally occurring crystals of bedded salt from Lyons and Hutchinson, Kansas. Considerations of the effects of stressing crystals of bedded salt on the migratin properties of brine inclusions within the crystals led to the conclusion that the most probable effects are a small fractional increase in the solubility of the salt within the liquid and a concomitant and equal fractional increase in the rate of the thermal gradient-induced migration of the brine. The greatest uncertainty relative to the prediction of rates of migration of brine into a waste emplacement cavity in bedded salt is associated with questions concerning the effects of the grain boundaries (within the aggregates of single crystals which comprise a bedded salt deposit) on brine migration through the deposit. The results of some of the estimates of rates and total amounts of brine inflow to HLW and SURF waste packages emplaced in bedded salt were included to illustrate the inflow volumes which might occur in a repository. The results of the brine inflow estimates for 10-year-old HLW emplaced at 150 kW/acre indicated inflow rates starting at 0.7 liter/year and totaling 12 liters at 30 years after emplacement. The results of the estimates for 10-year-old PWR SURF emplaced at 60 kW/acre indicated a constant inflow of 0.035 liter/year for the first 35 years after emplacement. (ERA citation 04:048213)

PNL-2378-4 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Nuclear Waste Management Quarterly Progress Report, October--December 1978.
A. M. Platt, and J. A. Powell. Mar 79, 65p
Contract EY-76-C-06-1830

The status of the following studies is given: decontamination and densification of chop-leach cladding residues; monitoring methods for particulate and gaseous effluents from waste solidification processes; TRU waste immobilization; krypton solidification; carbon-14 and iodine-129 fixation; waste management system; waste management safety; waste isolation safety assessment; well-logging instrumentation development for shallow land burial; monitoring and physical characterization of unsaturated zone transport; detection and characterization of mobile organic complexes of fission products; and electropolishing for surface decontamination of metals. (ERA citation 04:049547)

PNL-2658 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Characterization of the Hanford 300 Area Burial Grounds. Task II. Geochemical Analysis.
L. L. Ames, and S. J. Phillips. Apr 79, 68p
Contract EY-76-06-1830

The geochemical interaction of radionuclides with geologic materials must be understood in order to assess radionuclide migration from waste burial structures. In Task II, Geochemical Analysis, soil samples were taken from a representative disposal site to provide information that could be applied to the retired 300 Area Burial Grounds on the Department of Energy's Hanford Site, Washington. The site chosen for evaluation was the 316-4 Crib, which received liquid waste containing hexone and a total of 939 kg of uranium between 1948 and 1956. The methodology developed to analyze the soil samples combined neutron-enhanced autoradiography, x-ray fluorescence, and electron microprobe and radiochemical data. Results showed that the uranium content of the soil immediately underlying the crib is small. Furthermore, the uranium in the 316-4 Crib generally formed an insoluble phosphorus compound that was not readily leached under ambient conditions. However, uranium was easily leached in dilute acid solutions. Consequently, acidic solutions should not be added to waste burial structures that contain uranium compounds. The buffering and cation exchange capacity of the soil clay fraction tends to retard migration of the water-soluble forms, and uranium from the 316-4 Crib has not been detected in the Columbia River. No significant health hazard is apparent at present as a result ofuranium disposal at the 316-4 Crib; however, efforts should continue to restrict access to this site. (ERA citation 04:049560)

PNL-2727 PC **A05**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Safety Indices and Their Application to Nuclear Waste Management Safety Assessment.
J. W. Voss. Apr 79, 87p
Contract EY-76-C-06-1830

Thirteen indices have been examined to determine their potential applicability to operational waste management safety assessment. Two waste streams are presented on a normalized basis. These are the packaged spent fuel from the once-through fuel cycle and solidified high-level waste from a coprocessed UO sub 2 --PuO sub 2 fuel cycle. Seven of the indices are then calculated for a hypothetical surface storage scenario of the two wastes. The indices are examined on a consistent basis to identify any biases built into them, and to determine the sensitivities of each to various waste situations. The two waste streams are then compared on the basis of the indices to extend the understanding of the analysis techniques. The results of the analysis fall into two categories, index

evaluation and fuel cycle waste comparison. Only five of the indices are determined to be applicable to operational waste management safety assessment. The remainder are rejected either because they require very detailed input data; they are specifically designed for geologic isolation; they are extremely controversial in their application; or because they are particularly sensitive to a few specific radionuclides. The waste stream comparison yields three results: (1) the solidified high-level waste from the coprocessed UO sub 2 --PuO sub 2 fuel cycle may be potentially less hazardous than the packaged spent fuel from the once-through fuel cycle; (2) the removal of actinides, and especially plutonium, from spent fuel may reduce the potent hazard associated with the waste; and (3) after one million years of decay, the packaged spent fuel and solidified high-level waste are nearly the same on a hazard potential basis. (ERA citation 04:048194)

PNL-2879 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Entrapment of Krypton in Sputter Deposited Metals: A Storage Medium for Radioactive Gases.
G. L. Tingey, E. D. McClanahan, M. A. Bayne, and R. W. Moss. Apr 79, 37p
Contract EY-76-C-06-1830

Sputter deposition of metals with a negative substrate bias results in a deposit containing relatively large concentrations of the sputtering gas. This phenomenon has been applied as a technique for storage of the radioactive gas, exp 85 Kr, which is generated in nuclear fuels for power production. Alloys which sputter to yield an amorphous product have been shown to contain up to 12 atom % Kr (42 cm exp 3 of Kr(STP)/g of deposit; concentration equivalent to a gas at 4380 psi pressure). Release from these metals occurs at so low a rate that extrapolation to long times yields a exp 85 Kr release at 300 exp 0 C of about 0.06% in 100 years. A preliminary evaluation of the engineering feasibility and economics of the sputtering process indicates that exp 85 Kr can be effectively trapped in a solid matrix with currently available techniques on a scale required for handling DOE-generated waste or commercial reprocessed fuels and that the cost should not be a limiting factor. (ERA citation 04:049561)

PNL-2918 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Biobarriers Used in Shallow-Burial Ground Stabilization.
J. F. Cline. Mar 79, 24p
Contract EY-76-C-06-1830

These data show that cobblestone can be effective as a barrier to burrowing animals and insects, but not totally effective as a barrier to plant roots. Because of variable weather patterns at Hanford, five to six year studies are recommended for further evaluation of the effectiveness of different materials as biobarriers to radioactive substances. The following criteria must be met to present plant roots from entering buried waste and transporting radioactive or other elements to the soil surface where they can enter the food web: (1) the burial zone beneath the cover should be kept dry; (2) enough soil or other water-retaining substance should be placed in the cover to hold annual precipitation; (3) plants or other substances should be placed in the cover to remove soil moisture from site each year via evaporation and plant transpiration; and (4) different additions to the cover should be designed and placed over the buried waste to prevent burrowing animals from causing channelization of water through the cover to the lower levels. Stone size appeared to affect the plants' rate of root growth since root growth slowed in the air spaces between stones. Root toxin was 100% effective as a means of keeping roots out of the buried waste; this method could be used as a barrier modification where no plant cover is needed. 9 figures, 2 tables. (ERA citation 04:048214)

RFP-2863 PC **A02**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Waste Incineration and Immobilization for Nuclear Facilities. Status Report, October 1977--March 1978.
A. J. Johnson, S. C. Burkhardt, J. A. Ledford, and P. M. Williams. 17 May 79, 18p
Contract EY-76-C-04-3533

Fluidized bed incineration and processes for immobilization of wastes generated at nuclear facilities are undergoing development. After minor piping modifications to eliminate dust collecting points, a pilot plant fluidized bed incinerator run of 225 continuous hours was successfully completed in a demonstration of component reliability. Vitrification of incinerator ash and other wastes is now being accomplished using a pilot scale unit developed as a continuous flow process. (ERA citation 04:049553)

RHO-C-18 PC **A05**/MF **A01**
Resource Management Associates, Lafayette, CA.
Hanford Groundwater Modeling: Statistical Methods for Evaluating Uncertainty and Assessing Sampling Effectiveness.
D. B. McLaughlin. Jan 79, 93p RMA-8310
Contract EY-77-C-06-1030

This report is the first in a series of three documents which address the role of uncertainty in the Rockwell Hanford Operations groundwater model development and application program at Hanford Site. Groundwater data collection activities at Hanford are reviewed as they relate to Rockwell groundwater modeling. Methods of applying statistical and probability theory in quantifying the propagation of uncertainty from field measurements to model predictions are discussed. It is shown that measures of model accuracy or uncertainty provided by a statistical analysis can be useful in guiding model development and sampling network design. Recommendations are presented in the areas of model input data needs, parameter estimation data needs, and model verification and variance estimation data needs. 8 figures. (ERA citation 04:049562)

RHO-LD-78 PC **A03**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Thermal Analysis of Hanford Defense Waste Strontium and Cesium Capsules Isolated in Basalt.
J. D. Kaser. Jun 79, 33p
Contract EY-77-C-06-1030

Temperatures were calculated for cesium and strontium capsules packaged in steel canisters and isolated in deep basalt formation using the HEATING5 program. For the base case with an initial heat generation rate of 5 kW per canister, the maximum temperature reached at the borehole surface is 760 exp 0 F, while the canister surface reaches 845 exp 0 F and the capsule surface reaches 1155 exp 0 F. A sensitivity analysis showed that the temperature was most affected by changes in capsule power, basalt thermal conductivity, surface emissivity, and borehole diameter. Temperature was much less affected by changes in density and heat capacity of the basalt. Tunnel dimensions, minor changes in canister spacing or pitch had little effect. The discretization error of the numerical calculations is about 30 exp 0 F. 26 figures. (ERA citation 04:049563)

RHO-LD-78-24-4Q(Rev.1) PC **A03**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Summary of Radioactive Solid Waste Burials in the 200 Areas During 1978.
J. D. Anderson, and B. E. Poremba. 21 May 79, 48p
Contract EY-77-C-06-1030

This document summarizes quarterly the amount of radioactive materials that have been buried in the burial grounds. In addition to data for 1978, cumulative data since plant startup is presented. Also in this document is a listing of decayed activity to the various plant burial sites. (ERA citation 04:048226)

RHO-SA-99 PC **A02**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Evaluation of a Decommissioned Radwaste Pond.
D. Paine, K. R. Price, and R. M. Mitchell. Feb 79, 19p CONF-790209-8
Contract EY-77-C-06-1030
12. Health Physics Society midyear topical symposium, Williamsburg, VA, USA, 12 Feb 1979.

An eight hectare radwaste pond (216-S-17) which received cooling water effluent from a nuclear fuel reprocessing plant at Hanford from 1951 to 1954 was contaminated due to unplanned releases. Subsequently, it was decommissioned by covering the area with 45 to 60 cm of backfill. Soil erosion and nuisance contamination, in the form of tumbleweeds (Salsola kali), occurred between 1954 and 1972 due to the lack of a specific revegetation program. Siberian Wheatgrass (Agropyron sibericum) and Cereal Rye (Secale cereale) were planted in 1972 and allowed to grow under conditions. A routine evaluation of the site disclosed the presence of contaminated Siberian Wheatgrass plants. This report describes the results of a radioecological study of the site in 1978. Nondestructive methods developed for in-situ evaluation to determine radionuclide inventories and transport parameters for biotic and abiotic compartments are presented concomitant with standard procedures. Results indicate that Siberian Wheatgrass is a suitable perennial for revegetation of low-level waste disposal sites in an arid environment. (ERA citation 04:048220)

SAND-79-0531(V.1) PC **A08**/MF **A01**
Sandia Labs., Albuquerque, NM.
Immobilization of Defense High-Level Waste: An Assessment of Technological Strategies and Potential Regulatory Goals. Volume I.
Jun 79, 159p
Contract EY-76-C-04-0789

An investigation was made of the high-level radioactive waste immobilization technology programs in the U.S. and Europe, and of the associated regulatory programs and waste management perspectives in the countries studied. The purpose was to assess the ability of those programs to satisfy DOE waste management needs and U.S. regulatory requirements. This volume includes: introduction, immobilization strategies in the context of waste isolation program needs, high-level waste management as an integrated system, regulatory goals, engineered-barrier characteristics, barrier technology, high-level waste disposal programs, analysis of HLW immobilization technology in the context of policy and regulatory requirements, and waste immobilization program option. (ERA citation 04:048195)

SAND-79-0531(V.2) PC **A07**/MF **A01**
International Energy Associates Ltd., Washington, DC.
Immobilization of Defense High-Level Waste: An Assessment of Technological Strategies and Potential Regulatory Goals. Volume II.
Jun 79, 142p
Contract EY-76-C-04-0789

This volume contains the following appendices: selected immobilization processes, directory of selected European organizations involved in HLW management, U.S. high-level waste inventories, and selected European HLW program. (ERA citation 04:048196)

SAND-79-0789 PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Borehole Plugging Program. Plugging of ERDA No. 10 Drill Hole.
C. W. Gulick, Jr. Jun 79, 24p
Contract EY-76-C-04-0789

A requirement exists to plug exploratory drill holes located in the proposed Waste Isolation Pilot Plant area of Southeastern New Mexico. Sandia Laboratories, in cooperation with the US Army Corps of Engineers, Waterways Experiment Station, Concrete Laboratory, developed pumpable and durable cement grouts. These grouts were successfully used to plug an existing drill hole in the area. Results of this project are presented, along with comments and conclusions. (ERA citation 04:048221)

SAND-79-1117C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Technical Issues of Nuclear Waste Isolation in the Waste Isolation Pilot Plant (WIPP).
T. O. Hunter. 1979, 22p CONF-790822-4

Contract EY-76-C-04-0789
87. AICHE national meeting, Boston, MA, USA, 19 Aug 1979.

The development of the Waste Isolation Pilot Plant is supported by a research and development program which addresses various technical issues for geologic isolation of nuclear waste in bedded salt. These issues include waste interaction with the host material, structural response of the rock, repository sealing, and methods for repository design and operation. This paper discusses the status of various laboratory and field investigations in this program, and presents a summary of recent results for selected issues. In addition, an overview of all activities and the relations of each to plans for implementation of WIPP is presented. These plans include full-scale experimentation with various waste forms in 1986. (ERA citation 04:048222)

UCID-17858 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Suggested Technical Scheme to Help Resolve Regulatory Issues.
T. Harvey. Jul 78, 30p
Contract W-7405-ENG-48

A management-planning model envisioned as a useful tool for planning and guiding the development of a nuclear waste repository data base is described. It incorporates the technical assessment goals and objectives of the US Nuclear Regulatory Commission, and it provides a strategy for reaching them. The model strategy includes provisions for the breadth, timeliness, and defensibility of its predictions. Consideration is given to observational data, its structure, and future refinements. The structure of the data is consistent with the needs of a systems model whose structure is proposed to resolve questions about repository safety. Uncertainties are categorized as an aid in defining and resolving technical issues. The model provides a framework for ultimately exposing all the sensitive and controversial factors. Some quantitative aspects of data acquisition are presented. 12 figures. (ERA citation 04:049567)

UCRL-81992 PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Thermal-Stress Analysis of Rock Formations for Nuclear Fuel and Waste Storage.
R. C. Greenlaw, and M. A. Gerhard. 11 Jun 79, 28p CONF-790827-2
Contract W-7405-ENG-48
ADINA conference, Cambridge, MA, USA, 1 Aug 1979.

ADINA and ADINAT in partnership have provided a unique tool for analysis of heat flow, temperature distribution, and underground stresses and deformations due to excavation and storage of nuclear fuel and/or waste cannisters in hard rock formations. During this work we have determined successful and unsuccessful combinations of elements and properties for both the thermal and the stress analyses. In addition, we have determined a need for thermal radiation transport between portions of the model, as contrasted to radiation between the model and its surroundings. This latter need has been met in the interim by use of nonlinear bar conductors, and it will be satisfied in the future by a special user subroutine at ADINAT. The geological modeling was preceded by a period of code testing and verification during which it was found that at least one material model did not produce correct thermal stresses even though the thermal deformations were correct. We also found that thermal stresses were likely to be in apparent error due to differences in the way in which ADINA interpolates the temperature and strain fields within each element. Solutions to this problem are discussed. (ERA citation 04:048225)

18H. Radioactivity

CONF-790331-5 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Constraints on the Design of Flow Measuring Structures over a Large Dynamic Flow Range.
M. J. Hickey, and R. M. Holmes. 1979, 11p
Contract W-7405-ENG-26
Waste management seminar, Oak Ridge, TN, USA, 6 Mar 1979.

Topographical restraints for design storm flow are described as sharp-crested weirs for low flows in series with broad-crested weirs for the high flows. These design selections are considered to be most economical while providing the specified flow measuring capabilities for movement of radionuclides from the solid waste disposal areas into the surface streams around ORNL. (ERA citation 04:050583)

CONF-790602-53 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Potential Importance of Resuspension During Chronic Releases to the Atmosphere.
D. C. Kocher. 1979, 6p
Contract W-7405-ENG-26
ANS annual meeting, Atlanta, GA, USA, 3 Jun 1979.

During chronic releases of radionuclides to the atmosphere, airborne concentrations and resulting radiation exposures are often calculated by assuming that the contributions from resuspended activity are negligible compared with the contributions from direct atmospheric transport. In this paper, models which have been proposed to describe resuspension are used to estimate air concentrations and radiation exposures from resuspension for a chronic release time corresponding to an operating lifetime of a nuclear facility. The potential importance of resuspension is assessed by comparing the results with the same quantities from direct atmospheric transport. Application of available resuspension models to long-term chronic releases to the atmosphere results in resuspension concentrations which cannot be neglected compared with concentrations from direct atmospheric transport. If the resuspension factor is to be used in radiological assessments, further investigation into the proper values of the deposition velocity, initial resuspension factor, and resuspension decay constant for use in the models is needed. In the absence of a verified resuspension model, Horst has shown that resuspension can be conservatively accounted for by calculating air concentrations from direct transport without depletion due to deposition. (ERA citation 04:050580)

EML-356 PC **A23**/MF **A01**
Department of Energy, New York. Environmental Measurements Lab.
Environmental Measurements Laboratory Environmental Quarterly, March 1--June 1, 1979.
E. P. Hardy, Jr. 1 Jul 79, 550p

Environmental data that became available during the period from March 1 to June 1, 1979 are summarized. This report is divided into four main parts; interpretive reports and notes; EML Environmental Program data; data from sources other than EML; and recent publications related to environmental studies. The initial section consists of interpretive reports and notes dealing with Chinese nuclear test debris in the stratosphere, seawater concentrations of radium and thorium, radium in human bone, global fallout and dispersal of oceanic pollutants, chemical composition of wet and dry deposition, and strontium-90 in diet through 1978. The end of this first section consists of seven papers given at the 1978 New England Conference on Current Developments in Spectrochemical Excitation and Analysis. Individual papers (in scope) were abstracted and indexed for ERA/EDB. Subsequent sections include tabulations of radionuclide and trace metal concentrations in surface air, and exp 90 Sr concentrations in deposition, milk, diet, and tap water. A bibliography of recent publications related to environmental studies is also presented. (ERA citation 04:050563)

LBL-9080 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Annual Environmental Monitoring Report of the Lawrence Berkeley Laboratory, 1978.
G. E. Schleimer. Apr 79, 28p
Contract W-7405-ENG-48

Environmental monitoring data are reported for accelerator produced radiation; radionuclide measurements and release data from atmospheric and water sampling; population dose equivalent resulting from LBL operations; and non-radioactive pollutants. (ERA citation 04:050570)

NUREG/CR-1056 PC **A06**/MF **A01**
California Univ. Los Angeles. Lab. of Nuclear Medicine and Radiation Biology.
A Review of Behavior of Plutonium in Soils and Other Geologic Materials.
Technical rept.,
H. Nishita. Sep 79, 122p UCLA-12-1193
Contract NRC-60-79-075

Available information on the physical and chemical reactions of Pu in soils and other geologic materials is reviewed. The primary intent of this review was to bring together information that may be helpful in assessing the movement and biological availability of Pu in terrestrial environment. The review is divided into two general categories, e.g. studies of chemical reactions of Pu in aqueous solutions and studies of Pu reactions in the more complex systems of soils and other geologic materials. The latter category is further divided into studies of Pu in materials that were freshly contaminated in the laboratory and of Pu in materials that had been contaminated in natural environments and had resided there for varying numbers of years. After the discussion of physical and chemical reactions of Pu, several reported examples of the actual movement of Pu in terrestrial environments are given.

PB80-101314 PC **A06**/MF **A01**
Teknekron, Inc., McLean, VA.
A Study of Radioactive Airborne Effluents from Particle Accelerators.
Technical rept. (Final),
Joel I. Cehn. Aug 79, 115p ORP/TAD-79/12
Contract EPA-68-01-4997

This report discusses radioactive gas production around non-Federally owned particle accelerators, and the release of such gases to the atmosphere. The estimated 1200 non-Federally owned accelerators in the United States are categorized by type and energy, and the potential for radiogas production is discussed for various types. The results of field monitoring around two machines (a cyclotron and a Van de Graaff) are also presented. Estimates of annual radiogas releases from generic accelerator facilities are made. The isotopes of interest are: tritium (target gas) from a generic Van de Graaff; nitrogen-13, oxygen-15, and carbon-11 from a generic cyclotron; and argon-41 from a generic linac. Finally, control technologies to reduce airborne releases of these isotopes are discussed.

PB80-101959 PC **A05**/MF **A01**
Office of Radiation Programs, Washington, DC. Div. of Criteria and Standards.
Effect of Nuclear Power Generation on Water Quality in the Great Lakes.
Technical rept.,
Robert E. Sullivan, and William H. Eliet. Jul 77, 82p ORP/CSD-77-5

The 1972 Great Lakes Water Quality Agreement between the United States and Canada concerning improvement of the water quality of the Great Lakes has led to a study of the probable effects of nuclear power generation on radioactivity levels in the lakes. A simplified physical model of the Great Lakes system has been employed which assumes thorough annual mixing but allows for the perturbations in dilution volume required by the periodic establishment of thermoclines. Corrections are made, where necessary, for removal of radionuclides by sedimentation and equilibration. The results are given in terms of the concentration of radionuclides in each lake and the dose rates resulting from continuous, long-term ingestion of system waters. Dose calculations are performed using equations promulgated by the ICRP in Report 10. Using the model described, it is possible to obtain analytical solutions for the coupled differential equations describing these quantities. A Fortran computer program, GLA-1, has been employed to reduce calculational effort.

RFP-ENV-78 PC **A04**/MF **A01**
Atomics International Div., Golden, CO. Rocky Flats Plant.
Annual Environmental Monitoring Report, US Department of Energy, Rocky Flats Plant, January--December 1978.
R. D. Howerton. 15 May 79, 54p
Contract EY-76-C-04-3533

An environmental monitoring program that included the sampling and analysis of air, water, and soil

on and off the plant site was conducted. Particulate samples were collected from air samplers that operated continuously at the plant perimeter and in 12 communities located near the plant. An analysis of these samples indicated that the concentrations of airborne plutonium at perimeter and community locations were identical and were within the range attributed primarily to fallout from atmospheric nuclear weapons testing. The sanitary water was processed through a tertiary treatment facility before discharge, and the discharges were monitored for compliance with the Plant's National Pollutant Discharge Elimination System (NPDES) permit. Violations of NPDES daily limits occurred on nine occasions and were related to fluoride, pH, suspended solids, and biochemical oxygen demand. In all cases, the causes for these violations were identified and corrective actions taken. The plutonium, uranium, americium, and tritium radioactivity concentrations measured in Great Western Reservoir and Standley Lake during 1978 all were found to be less than 0.07% of the applicable DOE Radioactivity Concentration Guides. Drinking water from nine communities was monitored for plutonium, uranium, and americium. An assessment was made of the potential Plant contribution to public radiation dose. Total dose to the population living within 80 kilometers was calculated using the community radiation dose values. (ERA citation 04:050571)

SAND-78-2075C PC **A02**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.).
Effects of Wind Shift and Cross-Plume Concentration Models on Calculated Accident Consequences.
M. Schueckler, D. Aldrich, and A. Bayer. 1979, 9p CONF-790519-2
Contract EY-76-C-04-0789
European nuclear conference, Hamburg, F.R. Germany, 6 May 1979.

The dispersion of released atmospheric contaminants is normally treated using a Gaussian plume model. To simplify this treatment, the U.S. Reactor Safety Study (RSS) replaced the Gaussian cross-plume shape with a uniform, or top-hat, distribution. This simplification has two effects on the calculation of accident consequences. First, consequences calculated using the top-hat are limited to the assumed width of the distribution, whereas in actuality they might occur over either wider, or narrower, areas. Second, all persons affected by the plume at a given distance are exposed to the same average radionuclide concentrations, rather than the distribution from 0 to some peak value. To improve upon the top-hat treatment, a cross-plume concentration distribution with four distinct concentration steps was used in phase A of the German RSS. Using the phase A German RSS consequence model, a series of reactor accident consequence calculations was performed using eight different cross-plume concentration models. The results of these calculations are compared and discussed. To account for hourly wind direction changes a wind shift model has been proposed for use in the German RSS. The effects of this model on calculated accident consequences are also discussed. From the discussions, the following conclusions can be drawn: (1) the U.S. top-hat distribution overestimates early fatalities and slightly underestimates latent cancer fatalities; (2) for the calculation of latent cancer fatalities, a top-hat distribution with outer distances y/delta/sub y/ = 2 (width = 4delta/sub y/) is adequate; (3) for the calculation of early fatalities, a 2-step distribution with outer distances y/delta/sub y/ = (1.0, 2.0) might be adequate; and (4) use of the proposed wind shift model results in a moderate reduction in calculated early fatalities for releases of long duration. (ERA citation 04:050572)

18I. Reactor Engineering and Operation

BNL-NUREG-25862 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Nonlinear Dynamic Analysis of Piping System Using the PSEUDO Force Method.
S. Prachuktam, P. Bezler, and M. Hartzman. 1979, 11p CONF-790802-7
Contract EY-76-C-02-0016
International conference on structural mechanics in reactor technology, Berlin, F.R. Germany, 13 Aug 1979.

The nonlinearities induced by piping constraints are taken into account as generalized pseudo forces on the right-hand side of the governing hydamic equilibrium equations. Then an existing linear elastic finite element piping code, IPIPE, was modified to permit application of the procedure. This option was inserted such that the analyses could be performed using either the direct integration method or via a modal superposition method, the Newmark-Beta integration procedure being employed in both methods. The modified code was proof tested against several problems taken from the literature or developed with the nonlinear dynamics code OSCIL. The problems included a simple pipe loop, cantilever beam, and lumped mass system subjected to pulsed and periodic forcing functions. The problems were selected to gage the overall accuracy of the method and to insure that it properly predicted the jump phenomena accociated with nonlinear systems. Implementation of the method was found to be straightforward with the simplest iteration procedure for the psuedo force vector suffiicing. The results predicted with the method agreed in all important aspects with existing solutions as well as those generated with other methods. As with linear analyses, the modal superposition solution mode was found to be the most efficient, however, exhibiting slightly greater inaccuracies. (ERA citation 04:048654)

CAAP-TR-048 PC **A05**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Assessment of the Capability of the Existing Heat Transfer Data Base and of Designated Data Sources to Privide Data over the Calculated Heat Transfer Variable Ranges During a LOCA Blowdown.
J. R. Larson. May 79, 88p
Contract EY-76-C-07-1570

Data for transition boiling, film boiling and critical heat flux are compared to code calculated heat transfer variable ranges to determine whether the data are sufficient to support the calculations during the blowdown phase of a postulated loss of coolant accident. The data were selected from the Heat Transfer Data Bank. RELAP4/MOD5, RELAP4/MOD6 and TRAC-P1 calculated heat transfer variables of mass flux, pressure, quality, heat flux, and surface temperature are used in the study for the core and steam generator components of PWR and Semiscale systems. The various heat transfer regimes used by the codes for the core and steam generator are determined and a comparison of the usage is presented. Test facilities designated to provide heat transfer data during blowdown are evaluated with respect to their capability to provide data for heat transfer correlation development and testing. Conclusions and recomendations concerning the calculated heat transfer variable ranges and the data are presented. (ERA citation 04:050035)

CONF-790370-1 PC **A02**/MF **A01**
Argonne National Lab., IL.
Study of Structural Attachments of a Pool Type LMFBR Vessel Through Seismic Analysis of a Simplified Three Dimensional Finite Element Model.
H. Ahmed, and D. Ma. 1979, 15p
Contract W-31-109-ENG-38
International conference on structural mechanics in reactor technology, Berlin, F.R. Germany, 20 Mar 1979.

A simplified three dimensional finite element model of a pool type LMFBR in conjunction with the computer program ANSYS is developed and scoping results of seismic analysis are produced. Through this study various structural attachments of a pool type LMFBR like the reactor vessel skirt support, the pump support and reactor shell-support structure interfaces are studied. This study also provides some useful results on equivalent viscous damping approach and some improvements to the treatment of equivalent viscous damping are recommended. This study also sets forth pertinent guidelines for detailed three dimensional finite element seismic analysis of pool type LMFBR (to be published in a separate paper). (ERA citation 04:048617)

CONF-790402-24 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Exploiting the Steady State, Continuous Fueling Reactor Model.
D. R. Vondy, G. W. Cunningham, and T. B. Fowler. 1979, 19p
Contract W-7405-ENG-26
Computational methods in nuclear engineering, Williamsburg, VA, USA, 23 Apr 1979.

A continuously fueled reactor presents an analysis challenge, especially so when the neutron accounting is sensitive to the core design and the fuel handling. A scheme was implemented to solve the steady state, continuous fueling problem. This problem is an accurate model of the reactor for assessing performance at a point in its operating history. Available capability in a modular code system developed to treat fixed fuel reactors was extended in this effort. Parametric studies have been made with this capability to assess the performance of a pebble bed power plant reactor over a wide range of fueling possibilities. The model and the calculational methods are discussed. A global iteration scheme is used to effect a solution for the critical reactor state. The schemes used to accelerate the rate of convergence of one- and two-dimensional problems are described and the interactive behavior is shown for representative problems. (ERA citation 04:048579)

CONF-790423-1 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Development of a Nonequilibrium ECC Mixing Model for Use in RELAP4/MOD7.
S. R. Fischer, H. Chow, G. Van Arsdall, and H. Stadtke. 1979, 4p
Contract EY-76-C-07-1570
Multiphase flow and heat transfer symposium workshop, Miami Beach, FL, USA, 16 Apr 1979.

The nonequilibrium mixing model, which interfaces with the existing homogeneous equilibrium calculational scheme used in RELAP4, is described in detail. Preliminary comparisons between code calculations using the mixing model and experimental data are presented for Westinghouse Electric cold leg ECC injection tests, Battelle Columbus Laboratories and Creare ECC bypass tests, and LOFT and Semiscale tests. These code--data comparisons indicate the need for consideration of nonequilibrium effects in code simulations of the ECC bypass refill phase of postulated LOCA transients. In addition, these results point out the need for continued development of constitutive relations for use in modeling steam water mixing phenomena. (ERA citation 04:050036)

CONF-790655-3 PC **A03**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Reactor Vessel and Core Two-Phase Flow Ultrasonic Densitometer.
A. E. Arave. 1979, 41p
Contract EY-76-C-07-1570
Colloquium on two-phase instrumentation, Idaho Falls, ID, USA, 11 Jun 1979.

A local ultrasonic density (LUD) detector has been developed by EG and G Idaho, Inc., at the Idaho National Engineering Laboratory (INEL) for the Loss-of-Fluid Test (LOFT) reactor vessel and core two-phase flow density measurements. The principle of operating the sensor is the change in propagation time of a torsional ultrasonic wave in a metal transmission line as a function of the density of the surrounding media. A theoretical physics model is presented which represents the total propagation time as a function of the sensor modulus of elasticity and polar moment of inertia. Separate effects tests and two-phase flow tests have been conducted to characterize the detector. Tests show the detector can perform in a 343 exp 0 C pressurized water reactor environment and measure the average density of the media surrounding the sensor. (ERA citation 04:048677)

CONF-790655-6 PC **A03**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
JAERI Instrumented Spool Piece Performance in Two-Phase Flow.
J. B. Colson, and J. V. Gilbert. 1979, 33p
Contract EY-76-C-07-1570
Colloquium on two-phase instrumentation, Idaho Falls, ID, USA, 11 Jun 1979.

Instrumented spool pieces to be installed in horizontal piping on the Cylindrical Core Test Facility

(CCTF) at the Japanese Atomic Energy Institute (JAERI) have been designed and tested. The instrumented spool pieces will provide measurements from which mass flow rates can be computed. The primary instruments included in the spool pieces are a full-flow turbine, a full-flow perforated drag plate, and a low energy three-beam photon densitometer. Secondary instruments are provided to measured absolute pressure, fluid temperature, and differential pressure across the full-flow perforated drag plate. (ERA citation 04:048550)

CONF-790803-15 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Instrumentation for Localized Measurements in Two-Phase Flow Conditions.
G. G. Neff, R. H. Averill, and S. W. Shurts. 1979, 12p
Contract EY-76-C-07-1570
14. intersociety energy conversion conference, Boston, MA, USA, 5 Aug 1979.

Three types of instrumentation that have been developed by EG and G Idaho, Inc., and its predecessor, Aerojet Nuclear company, at the Idaho National Engineering Laboratory to investigate two-phase flow phenomenon in a nuclear reactor at the Loss-of-Fluid Test (LOFT) facility are discussed: (a) a combination drag disc-turbine transducer (DTT), (b) a multibeam nuclear hardened gamma densitometer system, and (c) a conductivity sensitive liquid level transducer (LLT). The DTT obtains data on the complex problem of two-phase flow conditions in the LOFT primary coolant system during a loss-os-coolant experiment (LOCE). The discussion of the DTT describes how a turbine, measuring coolant velocity, and a drag disc, measuring coolant momentum flux, can provide valuable mass flow data. The nuclear hardened gamma densitometer is used to obtain density and flow regime information for two-phase flow in the LOFT primary coolant system during a LOCE. The LLT is used to measure water and steam conditions within the LOFT reactor core during a LOCE. The LLT design and the type of data obtained are described. (ERA citation 04:048678)

CONF-790807-1 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Power Distribution and Control Element Reactivity Changes in Advanced Test Reactor Due to Beryllium Reflector Redesign.
W. D. Gregory, and W. L. Zimmermann. 1979, 5p
Contract EY-76-C-07-1570
Topical conference on reactor operating experience, Arlington, TX, USA, 5 Aug 1979.

A redesigned beryllium reflector has been installed in the Advanced Test Reactor (ATR) at the Idaho National Engineering Laboratory. The main feature of the redesigned reflector was the introduction of horizontal sawcuts at 13 different elevations immediately adjacent to the fuel region of the core. Two other significant core design changes were made at the same time: (1) the hafnium plates on the outer shim control cylinders were reduced in arc length from 134 exp 0 to 122 exp 0 , and (2) the inside diameter of the center flux trap baffle was reduced from 85.725 mm (3.375 in.) to 82.2325 mm (3.2375 in.) to increase the metal-to-water ratio in the center flux trap baffle region. Following installation of the redesigned components, zero power physics tests were made with a core of new fuel elements prior to resuming full power operation. The power distribution measurements were obtained in both the ATR and ATRC by irradiating U–Al flux wires in each of the forty fuel elements. The irradiated wires are counted for beta activity which is then converted to specific fission rate. The specific fission rate data are used to calculate point power densities and fuel element powers. (ERA citation 04:048679)

CONF-790808-1 PC **A02**/MF **A01**
Westinghouse Electric Corp., Madison, PA. Advanced Reactors Div.
Testing of the CRBRP Direct Heat Removal Service in a 1/21 Scale Model.
E. H. Novendstern, and P. S. Marinkovich. Aug 79, 17p
Contract EY-76-C-15-2395
18. ASME national heat transfer conference, San Diego, CA, USA, Aug 1979.

The Direct Heat Removal Service (DHRS) of the Clinch River Breeder Reactor Plant provides an alternative means of cooling of the core in the extremely unlikely event that both the normal and auxiliary heat paths are not available. The hot sodium is taken from the outlet plenum, cooled and returned into the outlet plenum at a different location; this sodium is mixed in the outlet plenum and pumped through the primary loops into the reactor core to remove the decay heat. The hydraulic performance of the outlet plenum was evaluated with a test using a 1/21 scale outlet plenum feature model. The model hydraulically simulated the Upper Internals Structure and the sodium within the reactor vessel. The hydraulic characteristics were studied to determine the amount of mixing which occurs in the outlet plenum. (ERA citation 04:048618)

CONF-790808-13 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Comparison of Numerical Results with Experimental Data for Single-Phase Natural Convection in an Experimental Sodium Loop.
R. J. Ribando. 1979, 53p
Contract W-7405-ENG-26
18. ASME national heat transfer conference, San Diego, CA, USA, Aug 1979.

A comparison is made between computed results and experimental data for single-phase natural convection in an experimental sodium loop. The tests were conducted in the Thermal-Hydraulic Out-of-Reactor Safety (THORS) Facility, an engineering-scale high temperature sodium facility at the Oak Ridge National Laboratory used for thermal-hydraulic testing of simulated LMFBR subassemblies at normal and off-normal operating conditions. Heat generation in the 19 pin assembly during these tests was typical of decay heat levels. Tests were conducted both with zero initial forced flow and with a small initial forced flow. The bypass line was closed in most tests, but open in one. The computer code used to analyze these tests (LONAC (LOw flow and NAtural Convection)) is an ORNL-developed, fast running, one-dimensional, single-phase finite difference model for simulating forced and free convection transients in the THORS loop. (ERA citation 04:048619)

CONF-790827-1 PC **A02**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Nonlinear Dynamic Analysis of Nuclear Reactor Primary Coolant Systems.
B. F. Saffell, Jr., R. W. Macek, T. R. Thompson, and R. F. Lippert. 1979, 17p
Contract EY-76-C-07-1570
ADINA conference, Cambridge, MA, USA, 1 Aug 1979.

The ADINA computer code is utilized to perform mechanical response analysis of pressurized reactor primary coolant systems subjected to postulated loss-of-coolant accident (LOCA) loadings. Specifically, three plant analyses are performed utilizing the geometric and material nonlinear analysis capabilities of ADINA. Each reactor system finite element model represents the reactor vessel and internals, piping, major components, and component supports in a single coupled model. Material and geometric nonlinear capabilities of the beam and truss elements are employed in the formulation of each finite element model. Loadings applied to each plant for LOCA dynamic analysis include steady-state pressure, dead weight, strain energy release, transient piping hydraulic forces, and reactor vessel cavity pressurization. Representative results are presented with some suggestions for consideration in future ADINA code development. (ERA citation 04:050039)

COO-2245-69 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Nuclear Engineering.
Coolant Mixing in LMFBR Rod Bundles and Outlet Plenum Mixing Transients. Progress Report, December 1,1978--February 28, 1979.
N. E. Todreas, M. W. Golay, and L. Wolf. 1979, 35p
Contract EY-76-S-02-2245

Information is presented concerning coolant mixing in bundle geometry and subchannel geometry, outlet plenum flow mixing, and theoretical determination of local temperature fields in LMFBR fuel rod bundles. (ERA citation 04:048622)

DNS-D-1-019(V.2) PC **A05**/MF **A01**
Dow Chemical Co., Midland, MI.
Chemical Cleaning of the Corrosion Fatigue Loop at Dresden-1. Volume 2, Sections 7.0 - 7.2.
26 Aug 78, 86p
Contract EY-76-C-02-4014

The radionuclide concentrations of the Dresden-1 decontamination pilot loop were determined by gamma spectroscopy. The General Electric Ge(Li) pipe gamma scanning system was utilized to take measurements at eight locations both before and after the pilot demonstration of decontamination process. Dose rate measurements were taken with a Cutie Pie at 30 additional locations. The percentage of Co-60 removed was calculated and the results were interpreted. Design drawings for the decontamination pilot loop are included. (ERA citation 04:048551)

DOE/TIC-10132 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Review and Analysis of Unusual Occurrence Reports, 1978.
1978, 48p
Contract W-7405-ENG-26

This report presents an index and analysis of final Unusual Occurrence Reports (UORs) received by the Nuclear Standards Office (NSO) during 1978. UORs covered by this report are those submitted by DOE-NPD and RRT contractors and laboratories in accordance with RDT standard F 1-3T, Preparation of Unusual Occurrence Reports. The bulk of the report consists of a list of occurrences by contractor and facility, a list of occurrences by accession number (AN) assigned by the NSO, and a key-word-in-context (KWIC) index of the occurrences. Tables are presented that show the frequency of broad categories of occurrences during the period; the types of equipment or systems involved in those incidents; and the factors responsible for them. (ERA citation 04:048648)

DOE-tr-40 PC **A10**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.).
Fast Breeder Project. Second Quarterly Report, 1977.
31 Aug 78, 209p
C KFK--1277/2. October 1977.Work performed under United States--W. Germany Fast Reactor Exchange Program.
U.S. Sales Only.

Progress is summarized in the areas of fuel rod development, materials studies, reactor kinetics, reactor safety, and cooling system technology. (ERA citation 04:050116)

DOE-tr-90 PC **A10**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Neutronenphysik und Reaktortechnik.
Behaviour of the Core of a Fast Sodium-Cooled Breeder Reactor of 2000 MW(E) During Disruptive Accidents with a Very Low Likelihood of Occurrence.
D. Struwe. Sep 78, 204p
C KFK--2490.Work performed under United States--W. Germany Fast Reactor Exchange Program.
U.S. Sales Only.

A structural phase diagram for hypothetical core disruptive accidents (HCDA) has been developed based on a variety of analyses for different LMFBRs. The intent was to identify the strategic phases of HCDAs which are important with regard to the safety aspects of the plant. These phases are investigated in detail for a 2000 MW(e) LMFBR (SNR-2000). Characteristic data of the SNR-2000 are discussed concerning their effect on safety analysis. Reasons for the choice of model parameters for special phenomena such as fuel-coolant interaction, fuel rod failure mechanisms, and sodium boiling are given. The results of calculations with CAPRI-2, HOPE and KADIS are analyzed for possibilities of entering into energetic core disassembly with consequences which would require power values below 2000 MW. (ERA citation 04:050115)

EPRI-NP-1014(V.2) PC **A10**/MF **A01**
General Electric Co., Sunnyvale, CA. Advanced Reactor Systems Dept.

Pool-Type LMFBR Plant 1000 MWe Phase A-Extension-2 Design. Part II: Plant Summary Description. Final Report.
Jun 79, 214p

This plant summary description volume covers the integrated Phase A plant conceptual design as it exists at the completion of Extension 2 work. In most cases the designs described are the reference arrived at after due consideration of reasonable alternatives. For a few specific design features, however, the lack of system and component development test data obscures the choice between alternatives. For these features certain alternate options remain under active interest. Examples of design features in this category are the upper internals structure, the pool thermal barriers and thermal insulation, the IHX flow distribution, and the hot pool thermal-hydraulic design in general. (ERA citation 04:048623)

FEI-741 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Obninsk. Fiziko-Energeticheskii Inst.
Kinetics of Stressed-Strained State of Cylindrical Fuel Elements with Thin-Walled Envelopes.
V. B. Bogush, V. V. Vakhromeeva, V. E. Kolesov, and Yu. I. Likhachev. 1977, 12p
In Russian.
U.S. Sales Only.

Described is the algorithm for solution of the problem relating to kinetics of the deformed-stressed state of the fuel element, which is based on the finite difference method. The nonlinear relationship between the stresses and deformations is reduced to the system of the transcendental equations for the functions describing this relationship. To improve stability of the differential circuitry and convergence of the range method during solution of the finite difference equations, there is introduced a regularization parameter. Considered are cylindrical axially-symmetrical rod-type (solid and hollow) and annular fuel elements with thin-walled jackets. The calculations are performed with due account for the plastic deformation, creep deformation, fuel and jacket swelling, coolant pressure, and irregularity of the temperature field. The calculation results are cited. (Atomindex citation 10:433382)

GA-A-14820 PC **A03**/MF **A01**
General Atomic Co., San Diego, CA.
GCFR Irradiation Experiments.
Oct 78, 49p CONF-790306-17
Contract EY-76-C-03-0167-023
International conference on fast breeder reactor performance, Monterey, CA, USA, 5 Mar 1979.

The fuel rods in the gas-cooled fast breeder reactor (GCFR) are vented and pressure equalized to avoid creep collapse of the cladding under external overpressure of 9 MPa (90 atm) of the helium coolant. The GCFR thermal flux mixed oxide fuel rod tests consisted of sealed rod experiment P-8 and vented rod sweep gas capsule experiments GB-9 and GB-10 in ORR. The GCFR epithermal flux tests include planned single-rod vented sweep gas experiment GB-11 and the helium loop tests of 12-ribbed-rod, vented bundle tests HELM 2 (UO sub 2 fueled) and HELM 3 (PuO sub 2 --UO sub 2 fueled), which are currently under way. The GCFR fast flux experiments consist of 13 encapsulated rods (7 rods at a time) in F-1 (X094), 10 encapsulated rods in F-3 (X206), and 43 unencapsulated rods (31 rods at a time) in the F-5 (X317) grid spaced bundle experiment. The objectives of the GCFR irradiation tests are given. (ERA citation 04:049912)

GA-A-14858 PC **A10**/MF **A01**
General Atomic Co., San Diego, CA.
GT-HTGR Plant Maintenance Studies.
Mar 79, 203p
Contract EY-76-C-03-0167-046

The progress of maintenance-related studies on the gas-turbine high-temperature gas-cooled reactor (GT-HTGR) power plant is reviewed. The studies, carried out with the support of participating utilities, are an ongoing effort during the plant conceptual and preliminary design phases. The primary objective of the GT-HTGR plant maintenance and inspection plan is to provide facilities, equipment, and component designs of reasonable cost that will yield good plant availability. It is therefore a matter of policy to design the reactor and power conversion system installation, as well as the related maintenance facilities, for practical operation for both planned and unplanned maintenance. (ERA citation 04:049888)

GA-A-15417 PC **A15**/MF **A01**
General Atomic Co., San Diego, CA.
HTGR Generic Technology Program. Semiannual Report for the Period Ending March 31, 1979.
Jun 79, 348p
Contract EY-76-C-03-0167-065

This document reports the technical accomplishments on the HTGR Generic Technology Program at General Atomic during the first half of FY-79. It covers a period when the major design direction of the National HTGR Program is in the process of changing from the HTGR-SC emphasis to an HTGR-GT emphasis in the near term. The HTGR Generic Technology Program activities have been redirected to ensure that the tasks covered are supportive of this changing emphasis in HTGR applications. The activities include the need to develop a medium enriched uranium (MEU) fuel, and the need to qualify materials and components for the higher temperatures of the gas turbine plant. (ERA citation 04:049889)

HEDL-SA-1579 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
In-Reactor Performance of Methods to Control Fuel-Cladding Chemical Interaction.
E. T. Weber, R. L. Gibby, C. N. Wilson, L. A. Lawrence, and M. G. Adamson. 1979, 15p
CONF-790306-15
Contract EY-76-C-14-2170
International conference on fast breeder reactor performance, Monterey, CA, USA, 5 Mar 1979.

Inner surface corrosion of austenitic stainless steel cladding by oxygen and reactive fission product elements requires a 50 mu m wastage allowance in current FBR reference oxide fuel pin design. Elimination or reduction of this wastage allowance could result in better reactor efficiency and economics through improvements in fuel pin performance and reliability. Reduction in cladding thickness and replacement of equivalent volume with fuel result in improved breeding capability. Of the factors affecting fuel-cladding chemical interaction (FCCI), oxygen activity within the fuel pin can be most readily controlled and/or manipulated without degrading fuel pin performance or significantly increasing fuel fabrication costs. There are two major approaches to control oxygen activity within an oxide fuel pin: (1) control of total oxygen inventory and chemical activity (delta anti GO sub 2) by use of low oxygen-to-metal ratio (O/M) fuel; and (2) incorporation of a material within the fuel pin to provide in-situ control of oxygen activity (delta anti GO sub 2) and fixation of excess oxygen prior to, or in preference to reaction with the cladding. The paper describes irradiation tests which were conducted in EBR-II and GETR incorporating oxygen buffer/getter materials and very low O/M fuel to control oxygen activity in sealed fuel pins. (ERA citation 04:049917)

HEDL-SA-1676 PC **A03**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Practical Considerations from Construction of the FFTF Pipe Support System.
J. O. Hartsell. Apr 79, 30p CONF-790488-7
Contract EY-76-C-14-2170
PEWG specialists - meeting, Richland, WA, USA, 23 Apr 1979.

Late this year the FFTF is scheduled to initiate criticality and power operation, an event signifying complete resolution of construction problems and compliance with applicable requirements. One of the tasks accomplished to achieve this position was the conduct of cell completion walkthroughs, problem identification, and resolution. Heavily oriented toward the final verification of pipe supports, the cell completion process identified and resolved a series of problems not readily apparent during the detailed design phases of plant construction. It is the objective of this presentation to establish a degree of awareness of these types of problems and of the FFTF techniques employed in resolution. All of the problems depicted herein have been solved and the installations corrected. (ERA citation 04:048680)

LA-UR-79-2037 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Developments in the LASL Fuel Pin Imaging System: PINEX-3A.
A. H. Lumpkin, G. J. Berzins, R. A. Cosimi, T. E. O'Hare, and J. R. Davidson. 1979, 11p CONF-790816-14
Contract W-7405-ENG-36
International meeting on fast reactor safety technology, Seattle, WA, USA, 19 Aug 1979.

The LASL Fuel Pin Imaging System was evaluated using a series of 10 TREAT transients, each of approx. 240-MW peak power. HEDL provided the fuel-ejection type capsule with annular fuel pellets. The pin visibility threshold was determined to be approx. 20-MW of TREAT power (approx. 130 W/g), almost an order of magnitude improvement over our PINEX-2 threshold. The impact of changes in instrumentation, imaging apertures, and fluors that produced the improved sensitivity are reported. Results of a time-integrated imaging technique are also presented. (ERA citation 04:048684)

LA-7746-MS PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Coprecal: Process Modifications for Safeguards Improvement. Addition of Aliquot Tanks (Preliminary Analysis).
H. A. Dayem. Jun 79, 16p
Contract W-7405-ENG-36

This report gives a preliminary assessment of the improvement in materials accountability in a Coprecal process that has been modified by adding aliquot tanks to feed the process lines. Materials balance uncertainties are reduced significantly because each process line is fed with small batches from tanks for which precise measurements and frequent instrument calibrations are possible. 3 figures, 6 tables. (ERA citation 04:049574)

LTR-125-9 MF **A01**
Idaho National Engineering Lab., Idaho Falls.
LOFT CIS Analysis 4"-WH-237-E Inside Containment Penetration S-17B.
M. E. Nitzel. 30 Oct 78, 1p RE-A-78-173
Contract EY-76-C-07-1570
Portions of document are illegible.
Microfiche copies only.

The stress analysis performed on the 4"-WH-237-E piping system inside containment penetration S-17B is presented. Deadweight, thermal expansion, and seismic loads were considered. Results of this analysis show that the subject piping system will meet ASME Code, Section III, Class 2 requirements. (ERA citation 04:048685)

NUREG/CR-0532-V-1 PC **A03**/MF **A01**
Science Applications, Inc., La Jolla, CA.
Safeguards Against Insider Collusion. Volume 1. Guide on the Design of Work Rules for Safeguarding Against the Employee Collusion Threat at Nuclear Fuel Facilities.
Technical rept.,
T. L. McDaniel, J. E. Glancy, and W. H. Horton. Oct 79, 42p SAI-78/996-LJ
Contract NRC-02-78-073

This report provides guidance for the development of work rules (i.e., procedures) that will assist in protecting nuclear fuel cycle facilities against threats involving employee collusion. The work rules discussed is this report also have applicability to other sensitive technology environments such as automated industries, nuclear power reactors, communications networks and certain military-industrial complexes. Evaluation criteria for safeguards performance against the threat of insider-inspired crimes of collusion are discussed. The five types of work rules presented in the report include the following: area zoning, function zoning, team zoning, time zoning and operation zoning. The strengths and weaknesses of each are discussed and examples given. The report also presents methods for optimizing safeguards or security

through the establishment of certain kinds and mixes of work rules.

NUREG/CR-0866 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Oxide Particle Size Distribution from Shearing Irradiated and Unirradiated LWR Fuels in Zircaloy and Stainless Steel Cladding: Significance for Risk Assessment,
W. Davis, Jr., G. A. West, and R. G. Stacy. Oct 79, 45p ORNL/NUREG-60
Contract W-7405-eng-26

The purpose of this report is to present data from sieve fractionation of both unirradiated and irradiated fuels and to describe their analysis in terms of the lognormal distribution function. The unirradiated fuels have been described previously, but the sieve-fractionation data have been summarized only briefly. Irradiated shearing and sieve fractionation of fuels from six reactors are presented here.

NUREG/CR-0899 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
High-Temperature Gas-Cooled Reactor Safety Studies for the Division of Reactor Safety Research Quarterly Progress Report, January 1-March 31, 1979,
S. J. Ball, J. C. Cleveland, J. C. Conklin, and S. J. Ditto. Oct 79, 41p ORNL/NUREG/TM-336
Contract W-7405-eng-26
See also NUREG/CR-0716.

Further development work was done on the ORECA, BLAST and FLODIS codes. BLAST was adapted to the West German THTR steam generator design. The refurbishing of the FLODIS code was completed, the sample calculations of design-basis depressurization accidents and loss-of-forced-convection accidents were run to make comparisons with other calculations. Follow-up investigations were also made of the Fort St. Vrain reactor oscillation problems.

NUREG/CR-0903 PC **E05**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Fuel Rod Behavior during Test PCM-4,
Roger L. Johnson, Pamela L. Lassahn, Zoel R. Martinson, Daniel T. Sparks, and David H. Schwieder. Aug 79, 92p TREE-1336
Contract DE-AC07-76IDO1570
Document includes 3 sheets of 48X reduction microfiche.

This report presents and discusses the results from Test PCM-4 of the Power-Cooling-Mismatch Test Series. The test was performed primarily to obtain fuel rod behavior data under sustained film boiling conditions. Additional information to determine the power level and flow rate required to induce departure from nucleate boiling (DNB), and to characterize propagation and termination of film boiling was obtained. Four individually shrouded, pressurized water reactor (PWR) type fuel rods were subjected to four DNB cycles under PWR environmental conditions. During the fourth cycle, sustained film boiling occurred for over 100 s and cladding temperatures exceeded the zircaloy beta phase transformation temperature. The fuel rod behavior during film boiling and the fuel rod damage as a result of the high temperature operation are discussed and conclusions are presented. The onset, propagation, and termination of film boiling are also discussed.

NUREG/CR-0913 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Generation of Hydrogen during the First Three Hours of the Three Mile Island Accident,
Randall K. Cole, Jr. Oct 79, 40p SAND-79-1357

Estimates of the amount of hydrogen generated by oxidation of fuel cladding during the first three hours of the Three Mile Island accident are presented. These results have been obtained using a combination of available data, carefully framed assumptions, and simple analytical models, and are compared with results from an existing computer code.

NUREG/CR-0959 PC **A07**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Experiment Data Report for LOFT Nonnuclear Small Break Experiment L3-0,
Peter G. Prassinos, Bobby M. Galusha, and Donald B. Jarrell. Aug 79, 143p TREE-1390
Contract DE-AC07-76IDO1570

Experiment L3-0 was the first Small Break Series L3 experiment conducted at the Loss-of-Fluid Test facility. This experiment was performed to obtain data for analytical code assessment and further understand the thermal-hydraulic behavior which occurs during a postulated loss-of-coolant accident in a pressurized water reactor. The specific objectives of Experiment L3-0 were to determine the break flow rate from available pressurizer pressure and level data, provide data to assess the transient pressure, temperature, and density for comparison with predictions from computer codes which model small break transients, determine if chugging occurs in the suppression tank during the small break blowdown, and provide operator training in performing small break experiments. The primary coolant system was approximately isothermal with the nuclear core in a shutdown condition and generating approximately 4.2 kW of decay heat. Following experiment initiation, the primary coolant system was depressurized to approximately 3.5 MPa at 2460 seconds by opening the pressurizer power operated relief valve. Plant recovery was accomplished by further plant depressurization using the quick-opening blowdown valves followed by plant refill using the low pressure injection system. The objectives of the experiment were successfully achieved. Recorded data for Experiment L3-0 are presented.

NUREG/CR-1001 PC **A04**/MF **A01**
Argonne National Lab., IL.
Comparison of Fission-Gas Release and Mechanical Behavior during Transient Nuclear and Electrical Heating of Light-Water-Reactor Fuels,
S. M. Gehl. Oct 79, 64p ANL-78-60

A determination was made of the suitability of the direct-electrical-heating technique for the simulation of transient-heating effects in light-water-reactor fuels. The magnitudes of fission-gas release and the types of transient-induced microstructural changes were found to be comparable for both nuclear and electrical heating. Apparent differences in the responses of fuels to the two heating methods were found to be the result of the differing irradiation histories of the fuels tested.

NUREG/CR-1061 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Quarterly Progress Report on Fission Product Behavior in LWRs for the Period April-June 1979,
A. P. Malinauskas, R. A. Lorenz, J. L. Collins, M. F. Osborne, and R. L. Towns. Nov 79, 22p
ORNL/NUREG/TM-348
Contract W-7405-eng-26
See also NUREG/CR-0917.

Tests BWR-2 and BWR-3 were performed during this report period; each test employed segment 4 from fuel rod F-6, bundle PH-006, which had been irradiated to about 12,700 MWd/MT during cycle 1 of the Peach Bottom-2 boiling water reactor (BWR). The test segment was pressure-ruptured at 850 degrees C in test BWR-2 and later heated at 1200 degrees C for 25 minutes in flowing steam in test BWR-3. Results are presented.

NUREG/CR-1083 PC **A09**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Sloshing of Water in Annular Pressure-Suppression Pool of Boiling Water Reactors Under Earthquake Ground Motions.
Technical rept.,
M. Aslam, W. G. Godden, and D. T. Scalise. Oct 79, 180p LBL-6754

This report presents an analytical investigation of the sloshing response of water in annular-circular as well as simple-circular tanks under horizontal earthquake ground motions, and the results are verified with tests. This study was motivated because of the use of annular tanks for pressure-suppression pools in boiling water reactors. Such a pressure-suppression pool would typically have 80 ft and 120 ft inside and outside diameters and a water depth of 20 ft. The analysis was based upon potential flow theory and a computer program was written to obtain time-history plots of sloshing displacements of water and the dynamic pressures. Tests were carried out on 1/80th and 1/15th scale models under sinusoidal as well as simulated earthquake ground motions. Tests and analytical results regarding the natural frequencies, surface water displacements, and dynamic pressures were compared and a good agreement was found for relatively small displacements. The computer program gave satisfactory results as long as the maximum water surface displacements were less than 30 in., which is roughly the value obtained under full intensity of El Centro earthquake.

NUREG/CR-1093 PC **A05**/MF **A01**
Mountain West Research, Inc., Tempe, AZ.
Three Mile Island Telephone Survey: Preliminary Report on Procedures and Findings.
Technical rept.,
Cynthia Bullock Flynn. Oct 79, 90p
Contract NRC-04-78-192

This report describes the methodology used in, and the results of, a telephone survey conducted in the vicinity of the Three Mile Island nuclear power plant. The survey is part of a study of the socioeconomic impacts of nuclear power plant construction and operation at Three Mile Island, and eleven other nuclear power plant sites. The survey covers the areas of evacuation behavior, information processing, short-term accident effects, continuing effects of the accident, and respondent's evaluation of TMI and nuclear power in general. Approximately 1500 households in the vicinity of the Three Mile Island nuclear power plant participated in the survey, which was conducted in July and August, 1979.

NUREG-0553 PC **A12**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of State Programs.
Beyond Defense-In-Depth: Cost and Funding of State and Local Government Radiological Emergency Response Plans and Preparedness in Support of Commercial Nuclear Power Stations.
Final staff rept. Jun 78-9 Oct 79,
Stephen N. Salomon. Oct 79, 266p

The current hodgepodge funding approach to State and local government radiological emergency response plans and preparedness in support of commercial nuclear power stations is inadequate, sporadic, uncertain, and frustrating. The creation of a Radiological Emergency Response Plans and Preparedness Fund for State and Local Government is offered as a preferred solution. Monies for the Fund could be derived from a one time fee of $1 million levied on the operator of each nuclear power station. The Fund should be administered by the NRC. For 40 States and 101 sites, the estimated national present value cost is $100 million to State and local governments for the period 1980 to 2000, assuming a discount rate of 10 percent and no inflation. Major component costs are for NRC concurrence in plans and preparedness of all impacted State and local governments, Implementation of the 10- and 50-mile Emergency Planning Zones for all sites, Enhanced plans and preparedness involving atmospheric release advisory capability and ring monitoring or some other offsite monitoring system, and Funding technical directors of local government. Some related Federal costs include Federal consultants to State and local governments, and Training, research, regional plans, and public information. The report also discusses actions by Federal and State agencies and points to long range considerations where preparedness could be enhanced by a coherent funding mechanism.

NUREG-0585 PC **A03**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Nuclear Reactor Regulation.
TMI-2 (Three Mile Island) Lessons Learned Task Force Final Report.
Oct 79, 50p

In its final report reviewing the Three Mile Island accident, the TMI-2 Lessons Learned Task Force has suggested change in several fundamental aspects of basic safety policy for nuclear power plants. Changes in nuclear power plant design and operations and in the regulatory process are dis-

cussed in terms of general goals. The appendix sets forth specific recommendations for reaching these goals.

ORNL-5497 PC **A08**/MF **A01**
Oak Ridge National Lab., TN.
Distribution and Transport of Tritium in the Peach Bottom HTGR.
R. P. Wichner, and F. F. Dyer. Aug 79, 154p
Contract W-7405-ENG-26

This report completes the first phase of a two-phase effort to describe and understand tritium production and movement in an operating high-temperature gas-cooled reactor (HTGR) system. The principal objective of phase 1 is to report the findings on tritium concentrations in core components acquired during the Peach Bottom Surveillance Program, which dealt with fission product migration in general, and a follow-on task devoted specifically to tritium. Administrative procedures are being developed for the second phase of the work to be performed in the Federal Republic of Germany under the auspices of the international umbrella agreement on gas-cooled reactor (GCR) development. In this effort, computer model predictions of tritium transport in the reactor system will be compared with observed concentration levels. (ERA citation 04:049901)

PB80-102718 PC **A08**/MF **A01**
Florida Univ., Gainesville. Dept. of Nuclear Engineering Sciences.
Neutronics and Energetics of Pulsed Gaseous Core Nuclear Systems.
Final rept.,
N. J. Diaz, E. T. Dugan, and C. C. Oliver. 30 Apr 78, 175p
Grant NSF-ENG75-01437

The conducted research program consisted of theoretical studies of the neutronics and energetics of pulsed gaseous core nuclear systems. The objective was to determine the basic physical characteristics of cyclic gaseous cores by a series of systematically improved theoretical treatments. The computational system is designed to simply and accurately describe the neutronic, heat transfer, and fluid flow characteristics which reflect a unique-to-the-pulsed-gaseous core system time dependence. These schemes can serve as a foundation for the experimental confirmation and development of the concept. Detailed analyses of the system neutronics with multiple feedback effects and of their influence on system behavior have been performed.

PB80-106958 Subscription
Nuclear Regulatory Commission, Washington, DC.
Three Mile Island Number 2 Dockets (Pre- and Post-Accident, 1964-July 1979).
1979, 12 issues
24X reduction microfiche.
Available on subscription, North American Continent price $875.00/year; all others write for quote. Subscription includes 5,5000 microfiche sheets, and 200 aperture cards per year. Also includes a special title list, NUREG-0568-REV-1. Subscription to microfiche only available as PB80-106966.

This special package includes Nuclear Regulatory Commission Docket Material for the Three Mile Island No. 2 reactor. These Docket issuances concern the licensing and operation of this reactor before and after the March 1979 incident. The aperture cards that are provided are designed to give an enlarged image (35mm) of the engineering drawings included in some of the Docket microfiche. Purchase of the aperture cards is optional. The publication, Title List Publicly Available Documents Three Mile Island Unit 2 Docket 50-320 (NUREG 0568, Rev. 1), will be furnished without charge as part of the order and serves as an index to this special collection of docket microfiche.

PB80-900400 Subscription
Nuclear Regulatory Commission, Washington, DC.
Nuclear Regulatory Commission Dockets - Current Issuances.
1979, 12 issues
24X reduction microfiche.
Available on subscription, North American Continent price $8,000.00/year; all others write for quote. Subscription includes 48,000 microfiche sheets, and 3,000 aperture cards per year, and a monthly issue of 'Title List of Documents Made Publicly Available'. Subscription to microfiche only also available as PB80-900500.

The Nuclear Regulatory Commission issues approximately 48,000 microfiche and 3,000 aperture cards per year as part of its Docket program. These Docket issuances concern the licensing and operation of power, research, and test nuclear reactors. NTIS provides a standing order service to these Dockets. The material is issued monthly. The aperture cards that are available are designed to give an enlarged image (35mm) of the engineering drawings included in some of the Docket microfiche. Purchase of the aperture cards is optional. The monthly publication, Title List of Documents Made Publicly Available (NUREG 0540), will be furnished without charge as part of the order and serves as an index to the monthly issues.

PB80-900600 Subscription
Nuclear Regulatory Commission, Washington, DC.
Nuclear Regulatory Commission Dockets - October 1978-September 1979.
1979, 12 issues
24X reduction microfiche.
Available on subscription, North American Continent price $6,800.00/year; all others write for quote. Subscription includes 40,000 microfiche sheets, and 3,000 aperture cards per year. Subscription to microfiche only also available as PB80-900700.

As part of the Nuclear Regulatory Commission's Docket program, NTIS is providing retrospective Docket items. These Docket issuances concern the licensing and operation of power, research, and test nuclear reactors. Both microfiche and aperture cards are included. The aperture cards are designed to give an enlarged image (35mm) of the engineering drawings included in some of the Docket microfiche.

PNL-2938 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
COBRA-IV Wire Wrap Data Comparisons.
T. E. Donovan, T. L. George, and C. L. Wheeler. Feb 79, 42p
Contract EY-76-C-06-1830

Thermal hydraulic analyses of hexagonally packed wire-wrapped fuel assemblies are complicated by the induced crossflow between adjacent subchannels. The COBRA-IV computer code simultaneously solves the hydrodynamics and thermodynamics of fuel assemblies. The modifications and the results are presented which are predicted by the COBRA-IV calculation. Comparisons are made with data measured in five experimental models of a wire-wrapped fuel assembly. (ERA citation 04:048641)

QLR-L-3-0 PC **A03**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Quick-Look Report on LOFT Nonnuclear Experiment L3-0.
D. B. Jarrell. Jul 79, 48p
Contract EY-76-C-07-1570

The preliminary evaluation has been completed of the results from nonnuclear Loss-of-Coolant Experiment (LOCE) L3-0, which was successfully conducted on May 31, 1979, in the Loss-of-Fluid Test (LOFT) facility. LOCE L3-0, the first experiment in the LOFT Small and Intermediate Break Series L3, simulated a small break at the top of the LOFT pressurizer by opening the power operated pressure relief valve. For this experiment, the nuclear core remained installed and in a shutdown condition. The initial conditions and plant configuration were similar to previous nuclear LOCEs performed in experiment Series L2 with the exception of the primary system being isothermal due to the lack of reactor heat input. Selected data, presented in this report, confirm that the objectives of LOCE L3-0 were successfully achieved. (ERA citation 04:050107)

SAN-0115-T5 PC **A02**/MF **A01**
SRI International, Menlo Park, CA.
Experimental Studies in CDA Work-Energy Attenuation. Quarterly Progress Report No. 17, 1 January to 31 March 1979.
R. J. Tobin, D. J. Cagliostro, C. M. Romander, and T. C. Goodale. 31 Mar 79, 22p
Contract EY-76-C-03-0115

The objectives of this program are to: develop a basic understanding of the dynamics and thermodynamics of expanding bubbles similar to the core disassembly accident (CDA) bubble in liquid metal fast breeder reactors (LMFBR); determine experimentally the structural response of an LMFBR to simulated CDA loads resulting from a postulated fuel vapor expansion; investigate potential hazards of CDA-generated missiles and sodium fires to the secondary containment system of the reactor; and investigate phenomena that may limit the work potential of HCDA bubble expansions. (ERA citation 04:048715)

SAN-2055-T1 PC **A04**/MF **A01**
Bechtel National, Inc., San Francisco, CA.
Review of Nuclear Power Reactor Decommissioning Alternatives.
Oct 78, 67p
Contract ER-78-C-03-2055

The aim of this study was to assess the validity of the AIF/NESP decommissioning study without introducing a new estimate with a new set of assumptions and bases. The approach taken in this assessment was to review the assumptions regarding the regulations applicable to the decommissioning effort and then to evaluate the alternatives proposed. The methodology and procedures employed were evaluated to assess their feasibility based on experience in the design and construction of nuclear power plants. Finally the cost estimates were analyzed without preparing a new detailed estimate. These reviews were then used to evaluate the overall acceptability of the AIF/NESP report as a basis for individual plant estimates and to identify those areas that appear to require additional support or further investigation. (ERA citation 04:049948)

SAND-78-1922 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
Description of the Map Board Portion of the Security Operations Center of the Plutonium Protection System.
C. E. Ringler. May 79, 34p
Contract EY-76-C-04-0789

This report describes the console map board which is part of the Sandia-designed Plutonium Protection System tested at the Hanford Works. The board displays areas under surveillance and contains alarm lights and switches for communicating with the system's computer. (ERA citation 04:049576)

SAND-79-0621 PC **A05**/MF **A01**
Sandia Labs., Albuquerque, NM.
Ultrasonic Thermometry System for Measuring Very High Temperatures in Reactor Safety Experiments.
G. A. Carlson, W. H. Sullivan, H. G. Plein, and T. M. Kerley. Jun 79, 83p
Contract EY-76-C-04-0789

Ultrasonic thermometry has many potential applications in reactor safety experiments, where extremely high temperatures and lack of visual access may preclude the use of conventional diagnostics. This report details ultrasonic thermometry requirements for one such experiment, the molten fuel pool experiment. Sensors, transducers, and signal processing electronics are described in detail. Axial heat transfer in the sensors is modelled and found acceptably small. Measurement errors, calculations of their effect, and ways to minimize them are given. A rotating sensor concept is discussed which holds promise of alleviating sticking problems at high temperature. Applications of ultrasonic thermometry to three in-core experiments are described. In them, five 10-mm-length sensor elements were used to measure axial temperatures in a UO sub 2 or UO sub 2 - steel system fission-heated to about 2860 exp 0 C. (ERA citation 04:050108)

SAND-79-1324C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Unattended Video Surveillance Systems for International Safeguards.
C. S. Johnson. 1979, 12p CONF-790707-7
Contract EY-76-C-04-0789

20. annual meeting of the Institute of Nuclear Materials Management, Albuquerque, NM, USA, 16 Jul 1979.

The use of unattended video surveillance systems places some unique requirements on the systems and their hardware. The systems have the traditional requirements of video imaging, video storage, and video playback but also have some special requirements such as tamper safing. The technology available to meet these requirements and how it is being applied to unattended video surveillance systems are discussed in this paper. (ERA citation 04:049579)

TFBP-TR-323 PC **A04**/MF **A01**
Idaho National Engineering Lab., Idaho Falls.
Reactivity Initiated Accident Test Series Test RIA 1-4: Experiment Operating Specification.
C. J. Stanley, and Z. R. Martinson. Jun 79, 69p
Contract EY-76-C-07-1570

This document describes the experiment operating specifications for the Reactivity Initiated Accident (RIA) Test RIA 1-4 to be conducted in the Power Burst Facility (PBF) at the Idaho National Engineering Laboratory as part of the Nuclear Regulatory Commission's Fuel Behavior Program. RIA Test Series I objectives are to provide data for the evaluation and possible revision of current nuclear reactor licensing criteria regarding hypothetical control rod drop or ejection accidents in commercial nuclear power plants. These experiments will also provide fuel performance data during a RIA event for model development and assessment purposes. Test RIA 1-4 will consist of a 3 x 3 array of preirridiated fuel rods. The nine fuel rods will be 5.7 wt% enriched UO sub 2 , zircaloy-4 clad, Westinghouse MAPI rods irradiated to an average burnup of approximately 5250 MWd/t in the SAXTON pressurized water reactor. (ERA citation 04:048716)

UCID-18129 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Technical Evaluation of the Susceptibility of Safety-Related Systems to Flooding Caused by the Failure of Non-Category I Systems for Turkey Point Nuclear Power Plant, Units 3 and 4.
E. K. Collins. Aug 79, 18p
Contract W-7405-ENG-48

Three separate reviews of the Turkey Point Units 3 and 4 were conducted by the FPLCO between 1972 and 1975. Initially, at the request of NBC in 1972, the FPLCO reviewed several water systems as sources of flooding. Subsequently, as a result of an abnormal occurrence, the drainage system was reviewed. Finally, the facilities were again reviewed at NRC's request and both the potential sources of flooding and safety-related equipment which could be damaged by flooding were identified. The sources of flooding and the appropriate safety equipment are discussed. An evaluation is presented of measures that were taken by FPLCO to minimize the danger of flooding and to protect safety-related equipment. (ERA citation 04:048564)

UCID-18130 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Computer-Aided Digitization of Graphical Mass Flow Data from the 1/5-Scale Mark I BWR Pressure Suppression Experiment.
G. S. Holman, and E. W. McCauley. 1 Jul 79, 20p
Contract W-7405-ENG-38

Periodically in the analysis of engineering data, it becomes necessary to use graphical output as the solitary source of accurate numerical data for use in subsequent calculations. Such was our experience in the extended analysis of data from the 1/5-scale Mark I boiling water reactor pressure suppression experiment (PSE). The original numerical results of extensive computer calculations performed at the time of the actual PSE tests and required for the later extended analysis program had not been retained as archival records. We were, therefore, required to recover the previously calculated data, either by a complete recalculation or from available computer graphics records. Time constraints suggested recovery from the graphics records as the more viable approach. This report describes two different approaches to recovery of digital data from graphics records. One, combining hard and software techniques immediately available to us at LLL, proved to be inadequate for our purposes. The other approach required the development of pure software techniques that interfaced with LLL computer graphics to unpack digital coordinate information directly from graphics files. As a result of this effort, we were able to recover the required data with no significant loss in the accuracy of the original calculations. (ERA citation 04:050112)

UCRL-81359 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Applicability of Flat Plate Methods in Determining Fluid/Structure Interaction Effects in BWR Pressure Suppression Systems.
G. S. Holman, E. W. McCauley, and S. C. H. Lu.
5 Mar 79, 21p CONF-790802-23
Contract W-7405-ENG-48
International conference on structural mechanics in reactor technology, Berlin, F.R. Germany, 13 Aug 1979.

Flat plate chord tests are one experimental method used to investigate how fluid/structure interaction (FSI) effects modify the impulsive loading in nuclear reactor pressure suppression pools. This analytical study examines the applicability of using a flexible flat plate in an otherwise rigid shell to model dynamic pool wall response in a flexible shell pressure suppression torus. Bubble pressures varying by a factor of seven are used as input to two-dimensional finite-element models. Boundary response to various plate and shell thicknesses are compared on the basis of equivalent natural frequency. Results indicate the qualitative flat plate response compares well with the flexible shell but absolute pressures vary significantly and nonconservatively. (ERA citation 04:048717)

UCRL-82420 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Tools for Assessing and Designing Material Control Processing Monitors.
D. R. Dunn, J. V. Candy, and R. B. Rozsa. 11 Jul 79, 11p CONF-790707-12
Contract W-7405-ENG-48
20. annual meeting of the Institute of Nuclear Materials Management, Albuquerque, NM, USA, 16 Jul 1979.

This paper reviews some of the computational tools for the assessment and design of Material Control and Accounting (MC and A) process monitoring components and illustrates their application to a Pu evaporator/concentrator unit operation. The codes include: (1) a general-purpose dynamic simulator for modeling the physical phenomenology of various chemical unit operations and their associated measurement systems, (2) an estimation code for simulating the operation of some modern signal processing algorithms (Kalman filter formulation), and (3) a set of detection algorithms for simulating on-line material loss detection algorithms for simulating on-line material loss detection. These codes can be used to address the issues of on-line material accounting and diversion detection for safeguarding SNM, and specifically with respect to arriving at meaningful performance measures. They can be used to compare state-of-the-art with state-of-the-practice and to study cost benefit tradeoffs. They are capable of treating stochastic models with nonlinear process and measurement dynamics and as a result should provide means for better designs of MC and A process monitoring components. (ERA citation 04:049580)

UCRL-82423 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Reserve Seismic Capacity Determination of a Nuclear Power Plant Braced Frame with Piping.
T. A. Nelson. 27 Feb 79, 11p CONF-790802-35
Contract W-7405-ENG-48
International conference on structural mechanics in reactor technology, Berlin, F.R. Germany, 13 Aug 1979.

A typical diagonal braced steel frame was developed to determine the amount of reserve capacity that is available beyond elastic design levels. The frame was analyzed first using elastic static and dynamic analyses. The loadings included dead and live load, an equivalent static lateral earthquake load, two response spectra and a suite of eight earthquake time history records. The response spectra used were the Housner and Regulatory Guide 1.60. The time histories represented different site conditions, distances to causative faults and magnitudes. The lateral static load and Housner spectrum represent vintage design criteria, while the R.G. 1.60 and time history analyses reflect current methodology. The elastic limit responses of the structure were determined along with the accompanying threshold peak ground accelerations (threshold g values). The frame was then analyzed using the program DRAIN-2D to perform two-dimensional elastic--plastic analyses for the eight time histories. (ERA citation 04:049972)

18J. Reactor Materials

CONF-790666-1 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Chemical Flowsheet Conditions for Preparing Urania Spheres by Internal Gelation.
P. A. Haas, J. M. Begovich, A. D. Ryon, and J. S. Vavruska. 1979, 70p
Contract W-7405-ENG-26
34. Northwest regional meeting of the American Chemical Society, Richland, WA, USA, 13 Jun 1979.

Small, ceramic urania spheres can be prepared for use as nuclear fuel by internal chemical gelation of uranyl nitrate solution droplets. Decomposition of hexamethylenetetramine (HMTA) dissolved in the uranyl nitrate solution releases ammonia to precipitate hydrated UO sub 3 . Previously established flowsheet conditions have been improved and modified at ORNL and have been applied to prepare dense UO sub 2 spheres with average diameters of 1200, 300, and 30 mu m. Acid-deficient uranyl nitrate (ADUN) solutions up to 3.4 M in uranium with NO sub 3- /U mole ratios of 1.5 to 1.7 are prepared by dissolution of U sub 3 O sub 8 or UO sub 3 . Continuous mixing of metered, cooled ADUN containing urea and HMTA solutions provides a smooth, regulated flow of the temperature-sensitive feed solution. The gelation times for solution drops in organic liquids at 45 to 95 exp 0 C depend on both the chemical reaction rates and the rates of heat transfer. The gel properties vary with temperature and other gelation variables. Gelation conditions were determined which allow easy washing, drying, firing, and sintering to produce dense UO sub 2 spheres of all three sizes. The 1200- and 300- mu m UO sub 2 spheres were pepared by gelation in trichloroethylene at 50 to 65 exp 0 C; 2-ethyl-l-hexanol was used as the gelation medium to prepare 30- mu m UO sub 2 spheres. Washing and drying requirements were determined. The gel dried to 225 exp 0 C contains about 95% UO sub 3 ; the remaining components are H sub 2 O, NH sub 3- , which are volatilized during firing to UO sub 2 . (ERA citation 04:048175)

DOE/ET/00944-1 PC **A06**/MF **A01**
South Carolina Univ., Columbia. Coll. of Engineering.
Mathematical Modeling of the Voloxidation Process. Final Report.
T. G. Stanford. Jun 79, 118p
Contract EY-76-S-09-0944

A mathematical model of the voloxidation process, a head-end reprocessing step for the removal of volatile fission products from spent nuclear fuel, has been developed. Three types of voloxidizer operation have been considered; co-current operation in which the gas and solid streams flow in the same direction, countercurrent operation in which the gas and solid streams flow in opposite directions, and semi-batch operation in which the gas stream passes through the reactor while the solids remain in it and are processed batch wise. Because of the complexity of the physical ahd chemical processes which occur during the voloxidation process and the lack of currently available kinetic data, a global kinetic model has been adapted for this study. Test cases for each mode of operation have been simulated using representative values of the model parameters. To process 714 kgm/

day of spent nuclear fuel, using an oxidizing atmosphere containing 20 mole percent oxygen, it was found that a reactor 0.7 m in diameter and 2.49 m in length would be required for both cocurrent and countercurrent modes of operation while for semi-batch operation a 0.3 m exp 3 reactor and an 88200 sec batch processing time would be required. (ERA citation 04:048178)

DOE/TIC-10141 PC **A02**/MF **A01**
Argonne National Lab., IL.
Corrosion Studies of Nuclear Piping in BWR Environments. Quarterly Report for the Quarter Ending December 31, 1978.
J. Y. Park, S. Danyluk, and W. J. Shack. Dec 78, 23p
Contract W-31-109-ENG-38

Intergranular stress-corrosion crack (ISCC) tests on sixteen sensitized WOL specimens in high-purity water with 8 ppM oxygen at 289 exp 0 C were carried out for total accumulated test times of up to 6.48 Ms. Initiation and propagation of an ISCC to approx. 0.1 mm was observed in one specimen (initial load 34 MPa.m/sup 1/2/, test time 6.48 Ms). No evidence of ISCC was observed in the other specimens. In some unfunded exploratory studies related to grain-boundary chemistry, Type 304 stainless steel was found to be susceptible to intergranular gracture upon mechanical impact after an appropriate heat treatment was given. The heat treatments that produce this fracture mode were identified for six heats of material. (ERA citation 04:048552)

GA-A-15440 PC **A03**/MF **A01**
General Atomic Co., San Diego, CA.
Consolidated Reprocessing Program. Quarterly Progress Report for the Period Ending May 31, 1979.
Jun 79, 33p
Contract EY-76-C-03-0167-053

This publication continues the quarterly series presenting results of work performed under the Consolidated Reprocessing Program at General Atomic Company. Results of work on this program prior to June 1974 were included in a quarterly series on the HTGR Base Program. The work reported includes the development of unit processes and equipment for reprocessing of High-Temperature Gas-Cooled Reactor (HTGR) fuel, the design and development of an integrated pilot line to demonstrate the head end of HTGR reprocessing using unirradiated fuel materials, and design work in support of Hot Engineering Tests (HET). Work is also described on trade-off studies concerning the required design of facilities and equipment for the large-scale recycle of HTGR fuels in order to guide the development activities for HTGR fuel recycle. (ERA citation 04:049537)

HEDL-SA-1399-FP PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Fabrication of ThO sub 2 , UO sub 2 , and PuO sub 2 -UO sub 2 Pellets.
D. E. Rasmussen, W. R. Jentzen, and R. B. McCord. 1978, 22p CONF-780545-10
Contract EY-76-C-14-2170
Meeting of the American Ceramic Society, Detroit, MI, USA, 6 May 1978, Portions of document are illegible.

Fabrication of ThO pellets for EBR-II irradiation testing and fabrication of UO sub 2 and PuO sub 2 -UO sub 2 pellets for United Kingdom Prototype Fast Reactor (PFR) irradiation testing is discussed. Effect of process parameters on density and microstructure of pellets fabricated by the cold press and sinter technique is reviewed. (ERA citation 04:048638)

HEDL-SA-1562-FP PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Thermochemical Data and Its Use in Modeling Chemical Behavior in Mixed-Oxide Fuel Pins.
R. L. Gibby, R. E. Woodley, M. G. Adamson, and C. E. Johnson. 1979, 15p CONF-790306-22
Contract EY-76-C-14-2170
International conference on fast breeder reactor performance, Monterey, CA, USA, 5 Mar 1979.

The status of US activities to obtain fuel chemistry data is reviewed. Analytical expressions addressing basic needs of all fuel chemistry models are presented. Fission product concentrations during irradiation, oxygen-to-metal (O/M) at beginning-of-life and at burnup, and the potential in fuel-cladding gap at burnup are described. (ERA citation 04:050361)

HEDL-SA-1690-FP PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Fast Reactor Neutron Absorber Materials.
D. E. Mahagin. Apr 79, 17p CONF-790420-16
Contract EY-76-C-14-2170
International symposium on ceramics in nuclear waste management, Cincinnati, OH, USA, 30 Apr 1979.

In a fast reactor, nuclear properties limit the number of materials that can be considered for use as neutron absorbers. On a worldwide basis the leading candidates are boron carbide, europium sesquioxide, and europium hexaboride. The performance of these materials is discussed with regard to current and future requirements. (ERA citation 04:048668)

HEDL-SA-1694-FP PC **A03**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Nuclear Fuel Powder Flow Characterization.
P. J. Densley, and J. W. Carson. Apr 79, 43p CONF-790420-19
Contract EY-76-C-14-2170
International symposium on ceramics in nuclear waste management, Cincinnati, OH, USA, 30 Apr 1979.

Based upon the flow characteristics of nuclear powders, a mass flow hopper required for dependable gravity flow would have outlet diameters of at least 11 inches (28 cm). Vibration of the hopper as well as storage in the hopper result in larger outlet openings for mass flow hoppers. (ERA citation 04:048176)

ORNL/TM-6850 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Chemical Flowsheet Conditions for Preparing Urania Spheres by Internal Gelation.
P. A. Haas, J. M. Begovich, A. D. Ryon, and J. S. Vavruska. Jul 79, 73p
Contract W-7405-ENG-26

Small, ceramic urania spheres can be prepared for use as nuclear fuel by internal chemical gelation of uranyl nitrate solution droplets. Decomposition of hexamethylenetetramine (HMTA) dissolved in the uranyl nitrate solution releases ammonia to precipitate hydrated UO sub 3 . Previously established flowsheet conditions have been improved and modified at ORNL and have been applied to prepare dense UO sub 2 spheres with average diameters of 1200, 300, and 30 mu m. (ERA citation 04:050346)

PNL-2946 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Coordinated Irradiation Plan for the Fuel Refabrication and Development Program.
J. O. Barner. Apr 79, 47p
Contract EY-76-C-06-1830

The Department of Energy's Fuel Refabrication and Development (FRAD) Program is developing a number of proliferation-resistant fuel systems and forms for alternative use in nuclear reactors. A major portion of the program is the development of irradiation behavioral information for the fuel system/forms with the ultimate objective of qualifying the design for licensing and commercial utilization. The nuclear fuel systems under development include denatured thoria--urania fuels and spiked urania--plutonia or thoria--plutonia fuels. The fuel forms being considered include pellet fuel produced from mechanically mixed or coprecipitated feed materials, pellet fuel fabricated from partially calcined gel-derived or freeze-dried spheres (hybrid fuel) and packed-particle fuel produced from sintered gel-derived spheres (sphere-pac). This document describes the coordinated development program that will be used to test and demonstrate the irradiation performance of alternative fuels. (ERA citation 04:050007)

PNL-2973 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Thoria Development Activities. Annual Report, Fiscal Year 1978.
P. E. Hart. Feb 79, 40p
Contract EY-76-C-06-1830

Pacific Northwest Laboratory's (PNL) ThO sub 2 development activities for FY-1978 are reviewed. These activities are in support of the FRAD (Fuels Refabrication and Development) program's goal of developing proliferation resistant fuel cycles. Included are results for the five ThO sub 2 fuel related elements that are assigned to PNL. During FY-1978, work on these elements has been directed primarily toward establishing the TOFDL (Thorium Oxide Fuel Development Laboratory) facility where unit operations for ThO sub 2 -based fuels will be defined and fuels for test irradiations fabricated. Additional activities include evaluation of ThO sub 2 powders derived by various oxalate precipitation conditions, the fabricability of commercially available ThO sub 2 powders, hybrid pellet fuel fabrication and definition of an irradiation test plan. (ERA citation 04:049535)

Y/DS-100(Rev.1) PC **A02**/MF **A01**
Oak Ridge Y-12 Plant, TN.
Projected Uranium Measurement Uncertainties for the Gas Centrifuge Enrichment plant.
J. M. Younkin. Jul 79, 19p
Contract W-7405-ENG-26

An analysis was made of the uncertainties associated with the measurements of the declared uranium feed streams in the GCEP. The UF sub 6 streams, representing the largest amount of uranium, produce the largest component of uncertainty. The systematic component of uncertainty of the UF sub 6 streams is the largest contributor to the total uncertainty. The random component of the UF sub 6 streams and the wastes measurement uncertainties are about equal in magnitude and only minor contributors to the total uncertainty. The total uncertainty for the GCEP is projected to be from 65 to 130 kg exp 235 U/year out of a measured total of 200,000 kg exp 235 U/year. (ERA citation 04:048174)

18K. Reactor Physics

LA-7861-MS PC **A05**/MF **A01**
Los Alamos Scientific Lab., NM.
SPECTRA-IV, Benchmark Spectra Based on LIB-IV.
R. B. Kidman. Jun 79, 99p
Contract W-7405-ENG-36

Flux and adjoint spectra for each of the Cross Section Evaluation Working Group fast reactor benchmarks are numerically and graphically presented in this handbook. The spectra were computed using a 50-group cross-section library (LIB-IV) that was generated with the MINX processing code using ENDF/B-IV data. The graphical figures compare smooth interpolated curves for the central flux, edge flux, central adjoint, transport reaction rate, and original cross-section averaging weighting function. (ERA citation 04:048639)

ORNL/TM-6843 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Iterative Behavior of Diffusion Theory Flux Eigenvalue Neutronics Problems.
D. R. Vondy, and T. B. Fowler. May 79, 39p
Contract W-7405-ENG-26

Information is presented about the iterative behavior of selected reactor neutronics problems applying the finite-difference diffusion theory approximation to neutron transport. Several problems were solved different ways to examine the effects of variations in the iteration procedures on the rate of convergence. Estimates of dominant error vector eigenvalues and their dependence on the inner iteration procedures are shown. This information is important because it serves as a guide for code development and application, lacking a thorough theoretical analysis of the iterative behavior. (ERA citation 04:049966)

19. ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

AD-A074 140/5 PC **A05/MF A01**
Army Materiel Systems Analysis Activity Aberdeen Proving Ground MD
Analysis of 155mm M483A1 Projectile Accuracy Based on 155mm M107 Projectile Registrations.
Technical rept.,
Walter N. Arnold, and H. Lynn Hartsell. Jun 79, 85p Rept no. AMSAA-TR-252

Current Field Artillery doctrine requires that each family of projectiles, such as the 155mm M483A1 and 155mm M107 projectile families have its own registration. This requirement dictates the firing of many projectiles which is not only expensive, but it also takes time and, in combat, probably reduces the chances of survivability. By being able to conduct a registration with one type of projectile and having the firing data applicable to all projectiles of the same caliber, regardless of shape and ballistic similarity, these problems would be minimized. This report presents an analysis of a series of test firings, which was conducted at Ft. Sill, OK during the Fall of 1977, to ascertain the ability of the 155mm M107 projectile to be used as a registration (spotter) round for the 155mm M483A1 projectile. (Author)

AD-A074 239/5 PC **A02/MF A01**
Army Materiel Command Alexandria VA
40MM Weapon Demonstration, Fort Ord, California.
9 Jun 66, 20p

This hand-out provides general information on the 40mm weapon prototypes and ammunition discussed and fired during the demonstration. The low and high velocity 40mm grenade launchers are development prototypes sufficiently advanced to indicate future potential in the use of self-powered weapons of this type. The 40mm manually operated automatic launcher uses the same weapon currently under development. Development tests have shown the weapon to be reliable and maintenance-free and could be made available more readily than the self-powered launcher.

AD-A074 346/8 PC **A03/MF A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Erosivity of a Nitramine Propellant with a Flame Temperature Comparable to M30 Propellant.
Memorandum rept.,
J. Richard Ward, and Robert W. Geene. Jun 79, 36p ARBRL-MR-02926, AD-E430 289

No abstract available.

LA-7761-MS PC **A02/MF A01**
Los Alamos Scientific Lab., NM.
Capacitive Discharge Firing System for Providing Acoustic Sources in the Hot Dry Rock Geothermal Energy Development Project.
W. W. Patterson, D. R. Deam, H. J. MacDonald, and R. H. Rochester. Jul 79, 15p
Contract W-7405-ENG-36

The development of a capacitive discharge firing unit designed to initiate electrically exploded foil slapper detonators in a subsurface, high-pressure (5000 psi), high-temperature (> 200 exp 0 C) environment is described. The unit is used to conduct acoustic ranging experiments in deep boreholes (approx. = 10,000 ft) in the Los Alamos Scientific Laboratory Geothermal Hot Dry Rock experiment. (ERA citation 04:049821)

MHSMP-79-22 PC **A04/MF A01**
Mason and Hanger-Silas Mason Co., Inc., Amarillo, TX.
Building 11-14A Incident Investigation.
R. J. Siepe. Mar 79, 51p
Contract EY-76-C-04-0487

On March 30, 1977, an explosion occurred in Building 11-14A, Bay 8, during a contact machining operation. An immediate investigation, under the direction of an Energy Research and Development Administration (ERDA) investigating board, was conducted. The board concluded the accident resulted from one or a combination of four probable causes. A follow-up investigation was conducted to determine the single most probable cause for the incident. It was concluded that the explosive billet on the lathe was initiated somewhere on the top circumferential area of the billet indicating that the most probable cause for the initiation was a machinist mallet used in centering operations. (ERA citation 04:050556)

MHSMP-79-25 PC **A02/MF A01**
Mason and Hanger-Silas Mason Co., Inc., Amarillo, TX.
Chemical Reactivity Test: A Compatibility Screening Test for Explosives.
L. C. Myers. Apr 79, 11p CONF-7905102-1
Contract EY-76-C-04-0487
Symposium on compatibility of plastics and other materials with explosives, propellants, and pyrotechnics, Albuquerque, NM, USA, 15 May 1979.

The chemical reactivity test is used to evaluate the compatibility of explosives with other materials. This test has been in use at Pantex for more than 15 years, and during this time several improvements have been made in the test apparatus. The basic test apparatus consists of a gas chromatograph with subambient temperature programming. A special inlet and a calibration system were designed and added to the chromatograph. Samples are conditioned in specially designed sample holders. A description of the test apparatus is given and data from a variety of different types of materials with explosives are discussed. Examples of various types of information which can be obtained from the test are also discussed. (ERA citation 04:050557)

MHSMP-79-32 PC **A02/MF A01**
Mason and Hanger-Silas Mason Co., Inc., Amarillo, TX.
Assay of TATB by HPLC, Precision and Accuracy Study.
C. L. Schaffer, and A. C. Teter. Jun 79, 7p
Contract EY-76-C-04-0487

The precision and accuracy of a HPLC method for the assay of TATB were determined. The average relative standard deviation (RSD) of the method is 0.57%. Only one TATB sample gave an RSD value greater than 1% and that sample was made by an experimental process using nitrobenzene as the amination solvent rather than toluene. The accuracy error of the analysis averaged 0.62%. (ERA citation 04:049088)

PATENT-4 148 259 Not available NTIS
Department of the Army Washington DC
Sabot Assembly for a Subcaliber Spin Stabilized Projectile.
Patent,
Ladd Yuhash, and Gary W. Fischer. Filed 3 Oct 77, patented 10 Apr 79, 4p AD-D006 346/1, PAT-APPL-838 781
Supersedes PAT-APPL-838 781-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A spherical convex pusher plate member is positioned intermediate the rear end of a subcaliber tubular projectile and the forward section of a cup shaped sabot carrier to improve the ballistic performance of the projectile by reduction of a parasitic weight and faster separation of the carrier after launch. Propellant gas pressures acting on the convex spherical section of the pusher plate causes deflection thereof sufficient to force the sabot to loosen from the projectile to provide an improvement in projectile velocity. (Author)

PATENT-4 149 447 Not available NTIS
Department of the Army Washington DC
Multi-Effect Passive Detonation Trap.
Patent,
Arne H. Wiedermann. Filed 29 Apr 77, patented 17 Apr 79, 4p AD-D006 355/2, PAT-APPL-792 152
Supersedes PAT-APPL-792 152-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A multi-effect passive detonation trap utilizes a manifold having a rectangularly shaped cross sectional area with oppositely disposed off-set pipeline fixedly connected thereto to attenuate an upstream detonation wave. The detonation wave is arrested by providing for maximum containment and self relief of the energy produced, directional control of the reaction, and a manifold configuration which assures extinction of the detonation wave. (Author)

PATENT-4 151 233 Not available NTIS
Department of the Army Washington DC
Method for Preparing a Smoke Agent.
Patent,
Raymond R. Fry, Jr. Filed 19 Oct 77, patented 24 Apr 79, 3p AD-D006 361/0, PAT-APPL-843 390
Supersedes PAT-APPL-843 390-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discusses an improved method for preparing a 'plasticized' red phosphorous smoke agent through the steps comprising mixing particulate red phosphorous with a non-swollen, commercial latex polymer 'plasticizer.' In the preferred embodiment, the latex polymer plasticizer is a butyl rubber. (Author)

UCRL-52692 PC **A02/MF A01**
California Univ., Livermore. Lawrence Livermore Lab.
Gas Evolution and Weight Loss from Thermal Decomposition of PBX-9404 Below 100 exp 0 C.
H. R. Leider, and D. L. Seaton. 27 Mar 79, 20p
Contract W-7405-ENG-48

Weight loss, gas evolution, and changes in composition that occurred during thermal decomposition of PBX-9404 were studied. It was determined that decomposition of the nitrocellulose (NC) binder was responsible for all observed changes. After a time, the rate of decomposition accelerated markedly - a phenomenon that has been observed in explosives and propellants containing NC. The onset of accelerated decomposition of PBX-9404 resulted in a fractional-weight loss of 0.004. The initial kinetics of the decomposition reactions were examined and calculations based either on weight loss or gas evolution indicated a zero-order process. The activation energies of decomposition derived from weight loss data and from the amount of gas evolved were nearly the same: 26.9 and 28.1 kcal/mol, respectively. (ERA citation 04:050558)

UCRL-82395 PC **A02/MF A01**
California Univ., Livermore. Lawrence Livermore Lab.
Status of the LLL Tandem-Shaped Charge Designs.
C. S. Godfrey, and R. A. Jandrisevits. 22 Feb 79, 18p CONF-790376-1
Contract W-7405-ENG-48
106. D.E.A.G. meeting, Frankfurt, F.R. Germany, 20 Mar 1979.

Lawrence Livermore Laboratory has been engaged in the design of tandem or multistage shaped charges for several years. Analytical and experimental work that focuses on how several aspects of tandem designs affect the jet characteristics is described. The work demonstrates the effectiveness of analytical methodology to specify liner geometries to achieve jets with controlled velocity gradients and high overall efficiency. It also shows that jet clippers and other ancillary components, along with controlled liner thickness, help make clean breaks between the jet and the slug and facilitate insertion of a second jet. Second-stage initiation and interjet time delays are discussed. (ERA citation 04:049089)

UCRL-82675(Rev.1) PC **A02/MF A01**
California Univ., Livermore. Lawrence Livermore Lab.

New TATB Plastic-Bonded Explosive.
J. R. Humphrey, and H. F. Rizzo. May 79, 20p CONF-790578-1
Contract W-7405-ENG-48
Hazardous materials American Defense Preparedness Association, Albuquerque, NM, USA, 15 May 1979.

A binder for use with the remarkably insensitive high explosive TATB that displays enhanced engineering properties for the compacted plastic-bonded explosive (PBX) is described. The binder in the original TATB formulation was Kel-F 800; although this binder may be used to produce high density, mechanically stable billets of TATB that can be machined, repeated thermal cycling between -54 and 74 exp 0 C causes permanent volume expansion (growth) of 1.5--2.0%. The debonding of binder from explosive that occurs during such growth reduces the mechanical strength of the material. It is shown that TATB also undergoes a secondary mechanical relaxation at about 30 exp 0 C that coincides with an increase in the coefficient of thermal expansion (CTE) to a higher value than that measured at lower temperatures. The new linear epoxy-type binder essentially eliminates growth, maintains strength after thermal cycling, suppresses the secondary mechanical relaxation, and lowers the CTE between ambient temperature and 74 exp 0 C by about 25%. (ERA citation 04:049090)

19C. Combat Vehicles

PATENT-4 125 052 Not available NTIS
Department of the Army Washington DC
Ammunition Rack for Tank Turret.
Patent,
Richard J. Thomas. Filed 9 May 77, patented 14 Nov 78, 6p AD-D006 331/3, PAT-APPL-794 909 Supersedes PAT-APPL-794 909-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a mechanism for releasably retaining a projectile in an upright position within a military tank. A solenoid-controlled pawl releasably engages a said surface of the projectile to retain said projectile in position. Energization of the solenoid withdraws the pawl from the projectile surface, thereby enabling the soldier to remove the projectile from the mechanism. (Author)

19D. Explosions, Ballistics, and Armor

AD-B041 485/4 PC **A03**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground Md Ballistics Research Lab
Influence of Material Viscosity on the Theory of Shaped-Charge Jet Formation.
Final rept.,
William P. Walters. Aug 79, 42p ARBRL-MR-02941, AD-E430 303
Distribution limited to U.S. Gov't. agencies only; Test and Evaluation; Aug 79. Other requests for this doucment must be referred to Commander, Army Armament Research and Development Command, Attn: DRDAR-TSB. Aberdeen Proving Ground, MD 21005.

The USSR has been engaged in viscosity measurements and visco-plastic material modeling for shock loaded materials since 1940. Shaped-charge jet or plate collapse models have been developed which are incompressible, one-dimensional, and viscid. In contrast, the USA employs a different modeling strategy where incompressible, inviscid flow is assumed for the simple one-dimensional jet or plate collapse models, and compressible, inviscid flow is assumed in the advanced axially symmetric hydrocode models. The USA advanced hydrocode models consider elastic-perfectly plastic stress-strain relationships or work hardening models, whereas the USSR models jet or plate collapse, under shock loading conditions, via visco-plastic or rate-dependent models. The USA establishes a jet-no-jet criterion and a jet cohesiveness criterion based on Mach number considerations or impinging angle considerations. Usually the Mach number is based on an ambient bulk speed of sound value. The USSR, with their incompressible, viscid flow model, uses a critical Reynolds number criterion to define the jet-no-jet condition. To use the USSR visco-plastic model, the constant (but unknown) viscosity coefficient must be determined. This parameter has been obtained from experiemental data for various materials under shock loading conditions. The purpose of this report is to present the one dimensional, USSR, viscous for jet or plate collapse and the USSR criterion f or jet formation and jet cohesiveness.

UCRL-82131 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Turbulent Dusty Gas Motions with Weak Statistical Coupling.
A. C. Buckingham. 17 May 79, 23p CONF-790704-1
Contract W-7405-ENG-48
12. AIAA fluid and plasma dynamics conference, Williamsburg, VA, USA, 24 Jul 1979.

Computer simulations are used to describe the random motions and resulting dispersal of gas borne particulates in turbulent internal ballistics flow. Force, energy and motion coupling between particles and gas is assumed weak, with negligible back-influence from particles to gas flow structure; thereby restricting present results to relatively low mass loading. Individual particle-to-gas relative velocities are obtained at incremental time steps by randomization subject to the constraint that their ensemble averaged motions are consistent with the locally computed turbulent intensity. Influence of the particles on turbulent transport and wall erosion is discussed. (ERA citation 04:048982)

19E. Fire Control and Bombing Systems

AD-A074 068/8 MF **A01**
Army Missile Research and Development Command Redstone Arsenal AL Technology Lab
Additional Software Developments for the HP-21 MX.
Technical rept.,
Michael C. Pitruzzello, and Jerrel R. Mitchell. 26 Jun 79, 78p Rept no. DRDMI-T-79-65
Availability: Microfiche copies only.

This report contains the description of four computer codes developed for the HP-21 MX minicomputer system housed in the Control System Branch of the Guidance and Control Directorate of the US Army Missile Research and Development Command (MIRADCOM). These codes (programs) were developed to aid in analyzing fire control systems being developed by the US Army. (Author)

AD-A074 145/4 PC **A02**/MF **A01**
Army Field Artillery School Fort Sill OK
Artillery Fire: a Bibliography of Periodical Articles.
Final rept.,
Lester L. Miller, Jr. 1 Oct 79, 17p Rept no. SB-66

Methods of applying artillery fire are introduced by this bibliography. Representative periodical articles on the subject are presented. They have been selected from the foldings of the Morris Swett Library. (Author)

AD-A074 352/6 PC **A03**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Chemical Systems Lab
The Nature of Gun Smoke and Dust Obscuration Due to Cannon Firing.
Technical rept.,
Edward W. Stuebing, Emmanuel A. Lucia, Frank D. Verderame, James J. Pinto, and Robert W. Doherty. Jul 79, 35p ARCSL-TR-79050, AD-E410 174

Fire control systems must contend with maintaining target visibility during firing. In addition, sophisticated future fire control systems have been proposed which provide an optical guidance link to the projectile, or track a fired projectile along its trajectory and sense the miss distance at the target for automatic correction. To be successful, these systems must be able to optically track the projectile during the first few seconds after firing, during which time the transparency of the atmosphere near the muzzle is very seriously degraded by gun gases, gun smoke, and dust clouds created from the ground by muzzle blast. This paper presents an analysis of optical transmission data in three wavelength regions (visible, near IR, and far IR) collected for single shot firing of a Rarden 30 mm cannon. Spectroscopic and light scattering techniques are used to identify muzzle gas and aerosol components, and a quantitative model is constructed using Mie scattering calculations to identify equivalent monodisperse aerosols for the smoke and dust. Concentrations of ammonia gas from the muzzle emissions which produce significant extinction in the 10.6 microns spectral region are identified and their dissipation with time is followed.

PATENT-4 143 835 Not available NTIS
Department of the Army Washington DC
Missile System Using Laser Illuminator.
Patent,
Walter B. Jennings, Jr., William B. McKnight, and Richard D. Milton. Filed 16 Aug 76, patented 13 May 79, 4p AD-D006 342/0, PAT-APPL-714 452 Supersedes PAT-APPL-714 452-76.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a system for intercepting a target with a missile having semi-active homing guidance. The target is discretely illuminated by a laser beam and the missile homes on the reflected illumination from the target. (Author)

19F. Guns

AD-A074 023/3 PC **A04**/MF **A01**
Wisconsin Univ-Madison Dept of Mechanical Engineering
A System Identification Methodology Using Dynamic Data for Analysis of Mechanisms.
Final rept. 1 Jan 77-30 Apr 79,
S. M. Wu. Aug 79, 59p ARO-14726.3-A-M
Grants DAAG29-77-G-0077, DAAG29-77-G-0081

Signals representing the force and displacement of the table of the M-139 machine gun during firing were analyzed. A constrained ARMA (2,1) model was fitted to the displacement data to explain the reason why the gun was jammed. Force data during and after firing were represented by the 4th and 6th order stochastic differential equation models. These models after decomposing yielded the dynamics of three subsystems; a supporting table, a recoil system and a bolt assembly. (Author)

AD-A074 024/1 PC **A05**/MF **A01**
Wisconsin Univ-Madison Dept of Mechanical Engineering
Investigation of Adaptive Control for Recoil Mechanisms.
Final rept. 1 Mar 77-31 Mar 79,
S. M. Wu, and A. Ma. Aug 79, 92p ARO-14618.1-A-E
Grants DAAG29-77-G-0076, DAAG29-78-G-0075

The Continuous System Simulation Language (CSSL) computer programs are developed in conjunction with the derivation of the mathematical models and optimum algorithm to study the effect of various orifice control laws on the optimal control for the M-37 recoil mechanism. The optimal control greatly decreases the average rod pull peak force and causes the force to level out to a nearly constant value following the peak. Based on the analysis of the acceleration signals of the recoil mechanism, a microprocessor based digital controller is designed to control the orifice area controller. (Author)

AD-A074 158/7 PC **A13**/MF **A01**
Army Infantry Center and Fort Benning GA
Report of the Rifle Marksmanship Evaluation Board.
28 Apr 61, 282p

As an initial step in its evaluation, the Board identified and analyzed Department of the Army's objec-

tives in the field of rifle marksmanship. This review revealed no clearly stated objective or objectives dealing with the total subject of rifle marksmanship. These objectives were analyzed and reanalyzed during all of the Board's discussions of the major problems and in final conclusion the Board recommends these as a statement of policy in establishment of an Army-wide rifle marksmanship program. (a) To develop in every soldier during Basic Combat Training: (1) The confidence, will, knowledge, and skills required to fire a rifle and hit enemy personnel in combat. (2) The ability to apply correct techniques of fire when he functions as an individual in a fire unit in the engagement of enemy personnel. (b) To insure that every soldier maintains a continuing degree of proficiency in combat rifle firing consistent with the mission of the unit to which the soldier is assigned. (c) To provide in time of peace a broad base of shooters from which potential precision target marksmen can be selected and further trained to successfully compete in interservice, civilian, and international competition.

AD-A074 203/1 PC **A05/MF A01**
Illinois Univ at Urbana-Champaign Dept of Mechanical and Industrial Engineering
Preliminary Study of a Recoil Mechanism Using Coulomb Friction.
Final rept.,
C. Cusano, and H. J. Sommer, III. Jul 79, 78p
Contract DAAK10-78-C-0152

This report is an investigation of the possible use of Coulomb friction for recoil energy dissipation in a friction recoil mechanism (FRM) for large bore cannon. Basic concepts and experimental friction material characteristics contributing to FRM functional and logistic feasibility are presented. From practical considerations, a recoil mechanism should be a relatively passive system incorporating automatic or intrinsic actuation prior to or at firing, should be self-contained, and should be tolerant of or compensate for variations in recoil travel. From a logistics standpoint, a recoil mechanism should demonstrate an extended in-service life, allow simple field servicing and repair, and permit long-term storage with rapid field recommission. The ultimate consideration of such a recoil system is its reliability over repeated firings. A single failure may cause catastrophic equipment damage and/or personnel injury. The comparative simplicity of conceptualized FRM hardware should allow superior performance in all three logistic areas stated above. FRM live/service interval would be a calculable function of the friction material wear rate and not a statistical estimate of effective seal life before failure. The simplicity and mechanical nature of FRM design should permit less complex service procedures.

AD-A074 295/7 PC **A07/MF A01**
ARINC Research Corp Annapolis MD
A Continuation of the Gun Weapon System Replacement Program Coordination Effort Study,
John Fedor, and Nick Lakis. Sep 79, 149p Rept no. 1661-01-1-2010
Contract N00174-79-C-0035

The Gun Weapon System Replacement Program (GWSRP) has initiated actions to coordinate various aspects of gun weapon system support with the Destroyer Engineered Operating Cycle (DDEOC) Program. This study presents the results of analyses of baseline overhaul repair requirements for gun weapon systems, the GWSRP and DDEOC Program Management Information System (MIS) data interface, GWSRP support to DDEOC Program site teams, update of NAVSEAINST 8300.2A 'Gun Weapon System Replacement Program', and overall coordination of the GWSRP and DDEOC Program. All analyses were limited to items of significance to both the GWSRP and the DDEOC Program. The conclusions and recommendations presented are intended to provide program managers with guidelines for the coordination of their respective maintenance management activities and improvement of their current procedures. (Author)

PAT-APPL-6-050 273 PC **A02/MF A01**
Department of the Air Force Washington DC
Liquid Propellant/Regenerative Charging System Bubble Preventer.
Patent Application,
John Campbell, Jr. Filed 19 Jun 79, 6p AD-D006 306/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

By angling the propellant fluid inlet to the charging chamber of a liquid propellant gun and having a central vent, the tangential swirling of the entering fluid clears the chamber and the fluid of entrapped gas. (Author)

PAT-APPL-6-050 274 PC **A02/MF A01**
Department of the Air Force Washington DC
Control Piston for Liquid Propellant Gun Injector.
Patent Application,
Vance W. Jaqua. Filed 19 Jun 79, 9p AD-D006 307/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

To understand the operation of the novel damper piston of this invention, it may be helpful to briefly review the functioning of the conventional, prior art, regenerative feed system in liquid propellant guns. The regenerative feed system is basically a pressure intensifier or pressure amplifier in principle where the combustion chamber face of the system has a significantly greater area than the hydraulic face area of the propellant injection piston sections. Thus, an increase in combustion chamber pressure will be reflected by a greater increase in propellant injection pressure causing the propellants to spray into the chamber as the piston is forced rearward by the combustion chamber pressure. The injection flow rate is primarily a function of velocity of the piston assembly. (Author)

PATENT-4 117 760 Not available NTIS
Department of the Army Washington DC
Feed Pawl Antibounce Device.
Patent,
Charles J. Schertz, and Dennis L. Wilson. Filed 14 Apr 77, patented 3 Oct 78, 7p AD-D006 326/3, PAT-APPL-787 407
Supersedes PAT-APPL-787 407-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent concerns a feed pawl antibounce device that prevents jamming of a round feed apparatus when the pawl clears the round and is moved into position to feed the round from its feed position to its chambering position in front of the open bolt.

PATENT-4 154 012 Not available NTIS
Department of the Army Washington DC
Expendable Launcher for Non-Lethal Ring Airfoil Projectile.
Patent,
Miles C. Miller. Filed 25 Nov 77, patented 15 May 79, 4p AD-D006 369/3, PAT-APPL-854 569
Supersedes PAT-APPL-854 569-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A pre-loaded grenade launcher attachable to the muzzle of a gun is constructed of inexpensive plastic and contains a grenade. After quick attachment of the launcher to a gun, and launching of the grenade, the launching attachment is discarded and may be replaced by another pre-loaded launcher. (Author)

PATENT-4 154 142 Not available NTIS
Department of the Army Washington DC
Externally Powered Carrier.
Patent,
Roy F. Schwegler. Filed 6 Sep 77, patented 15 May 79, 7p AD-D006 372/7, PAT-APPL-831 012
Supersedes PAT-APPL-831 012-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent describes an externally powered carrier for an automatic weapon wherein rotary movement of an electric motor is translated into fore and aft movement of the carrier by means of an eccentrically positioned motor driven pin moving laterally in a transverse carrier cam track. (Author)

PATENT-4 163 411 Not available NTIS
Department of the Air Force Washington DC
Breech Closure Mechanism.
Patent,
Robert N. Teng. Filed 29 Dec 77, patented 7 Aug 79, 5p AD-D006 314/9, PAT-APPL-865 467
Supersedes PAT-APPL-865 467-77, AD-D004 696.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent covers a mechanism for releasably holding and pre-heating a model, prior to launch of the model by and from a gun. The model is initially held in a collar of the mechanism in the breech of the gun, and is pre-heated by an induction coil and an r-f current. The coil is then removed, and the model and the collar are propelled forward through the breech by pressurized hydrogen gas, with the breech being closed and with the heated model being inserted into the launch tube (i.e., the 'barrel') of the gun. The gun is then fired, and the heated model is launched, without any significant cooling of the model. Some advantages of this mechanism are a quick 'heat-and-fire' cycle, and the simplicity in structure and in operation of the mechanism.

19G. Rockets

PATENT-4 108 700 Not available NTIS
Department of the Army Washington DC
Method of Making Coned Joint for Joining Dissimilar Diameter Filament Wound Tubes.
Patent,
Glen A. Clodfelter. Filed 5 May 77, patented 22 Aug 78, 4p AD-D006 324/8, PAT-APPL-794 329
Supersedes PAT-APPL-794 329-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent concerns a coned joint for the purpose of structurally joining two filament wound tubes, having dissimilar diameters, into a single launch tube. After being joined together, the assembled tubes have a straightness equal to or better than a comparable rolled or fabricated metal tube in addition to being lighter and less costly to produce.

PATENT-4 116 404 Not available NTIS
Department of the Army Washington DC
Automatic Balancing Concept.
Patent,
Thomas H. Howell. Filed 22 Jul 77, patented 26 Sep 78, 5p AD-D006 325/5, PAT-APPL-818 188
Supersedes PAT-APPL-818 188-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent concerns an automatic balancing concept including two annular containers used to dynamically balance a rocket during flight. The containers are partially filled with a high density fluid and are installed forward and aft of the longitudinal CG of the rocket. When spin is induced in the rocket the radial CG will shift to the spin axis and the fluid will couple itself to the outside diameter of the ring.

PATENT-4 132 150 Not available NTIS
Department of the Army Washington DC
Blast Actuated Detent.
Patent,
Donald J. Conn. Filed 8 Aug 77, patented 2 Jan 79, 3p AD-D006 335/4, PAT-APPL-822 851
Supersedes PAT-APPL-822 851-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent concerns a detent device that is applicable to rocket launch systems where the rockets

must be positively retained on the launcher prior to the time of launch. The device engages a detent groove in the rocket and restrains the rocket from any forward motion until launch at which time a cam lifts the detent out of the groove thereby releasing the rocket. (Author)

PATENT-4 137 351 Not available NTIS
Department of the Army Washington DC
Filament/Epoxy Camouflage Launch Tubes.
Patent,
Glen A. Clodfelter, and Ocke C. Fruchtnicht.
Filed 3 Apr 78, patented 30 Jan 79, 3p AD-D006 339/6, PAT-APPL-892 542
Supersedes PAT-APPL-892 542-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Filament/epoxy camouflage launch tubes are considered in which the launch tubes are fabricated using conventional filament winding processes and materials, and in which each tube is bonded together with an epoxy resin system in which the epoxy resin system includes coloring agents for coloring the launch tubes in a camouflage color that colors the launch tube through and through. The exact color of the launch tube can be varied by varying the amount of the coloring agent.

PATENT-4 153 282 Not available NTIS
Department of the Army Washington DC
Coned Joint for Joining Dissimilar Diameter Filament Wound Tubes.
Patent,
Glen A. Clodfelter. Filed 27 Feb 78, patented 8 May 79, 4p AD-D006 367/7, PAT-APPL-881 976
Supersedes PAT-APPL-881 976-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent concerns a coned joint for the purpose of structurally joining two filament wound tubes, having dissimilar diameters, into a single launch tube. After being joined together, the assembled tubes have a straightness equal to or better than a comparable rolled or fabricated metal tube in addition to being lighter and less costly to produce.

20. PHYSICS

20A. Acoustics

AD-A073 902/9 PC **A03**/MF **A01**
Naval Postgraduate School Monterey CA
Acoustic Properties of Sediments at Weapons Test Ranges of the Naval Undersea Warfare Engineering Station, Keyport, Washington.
Technical rept.,
O. B. Wilson, Jr., and Robert A. Helton. Jun 79, 48p Rept no. NPS-61-79-005

Estimates are made of sound absorption and sound speed characteristics of sediments at the Dabob Bay and Keyport Shallow Water ranges operated by the Naval Undersea Warfare Engineering Station, using empirical models developed by Hamilton and mean grain size and porosity data measured in samples collected by the authors. Data reported by earlier investigators permit estimates to be made also for sediments at the Nanouse and Jervis Inlet ranges. The purpose is to provide information which can be used in the design and evaluation of acoustic imaging devices which maybe able to ease the problems of locating and recovery of torpedoes which became buried in the sediments. Field and laboratory procedures are described. Also reported are the results of measured sound speeds in a number of the gravity core samples The most common surficial sediment is a soft, saturated silty-clay mud. For such sediments the sound absorption coefficient alpha in dB per meter should be given approximately by alpha = 0.1 where F is the sound frequency in kHz. It is concluded that sound absorption in these sediments, although not small, should not preclude the short range use of an acoustic imaging system operating at moderate frequencies. The possibility and the consequences of the existence of of gassy sediments is discussed. (Author)

AD-A074 039/9 Not available NTIS
Wayne State Univ Detroit MI Dept of Mathematics
Stochastic Inverse Problem in the Radiation of Noise,
P. L. Chow, and L. Maestrello. 19 Sep 77, 13p ARO-12360.9-M
Grants DAAG29-76-G-0141, NSG-1330
Availability: Pub. in SIAM Jnl. of Applied Mathematics, v35 n4 p665-677 Dec 78. (No copies furnished by DDC).

No abstract available.

AD-A074 050/6 PC **A05**/MF **A01**
Construction Engineering Research Lab (Army) Champaign IL
The Blast Noise Prediction Program: User Reference Manual.
Interim rept.,
V. Pawlowska, and L. Little. Aug 79, 78p Rept no. CERL-IR-N-75

This report provides user instructions for the U.S. Army Construction Engineering Research Laboratory's (CERL's) Blast Noise Prediction computer program, BNOISE 1.0, which is designed to predict the noise impacts of Army blast-noise operations. This report is designed to serve as a reference manual and describes the manipulation of the modules used by the Blast Noise program, provides a sample run, and gives a list of module error messages. (Author)

AD-A074 105/8 PC **A02**/MF **A01**
Columbia Univ Dobbs Ferry NY Hudson Labs
On the Statistics of Ambient Noise,
Elizabeth M. Arase, and T. Arase. 1963, 11p Rept no. INFORMAL DOCUMENTATION-126
Contract Nonr-266(84)

The statistics of ambient noise have been investigated previously for single receivers. No studies have been made for ambient noise with arrays. Data are presented for ambient noise measured with arrays with 30 to 60 elements. Amplitude samples of ambient noise were taken at 30-msec intervals. The period is long enough to ensure that successive samples are independent. Sets of 2000 to 3000 points were taken. Noise statistics were also taken with random addition of the elements. No significant difference was found for the statistics of the two cases. Distribution functions and moments up to the fourth order were computed and will be presented. (Author)

AD-A074 108/2 PC **A03**/MF **A01**
Michigan State Univ East Lansing Ultrasonics Lab
Optical Methods for Absolute Measurement of Sound Pressure in Liquids.
Technical rept.,
E. A. Hiedemann. Jul 62, 35p Rept no. TR-6
Contract Nonr-2587(01)

Contents: Numerical Calculations of Merten's Correction for Zero and First Orders; Demonstration of the 'Least Stable Waveform' of Finite Amplitude Waves; Optical Measurement of the Sound-Pressure Amplitude and Waveform of Ultrasonic Pulses; Diffraction of Light by Two Spatially Separated Parallel Ultrasonic Waves of Different Frequency; and Pressure Variation of the Index of Refraction of Liquids.

AD-A074 112/4 PC **A03**/MF **A01**
Michigan State Univ East Lansing Ultrasonics Lab
Optical Methods for Absolute Measurement of Sound Pressure in Liquids.
Technical rept.,
E. A. Hiedemann. Feb 62, 49p Rept no. TR-5
Contract Nonr-2587(01)

Contents: The Study of Ultrasonic Waveform by Optical Methods; On the Diffraction of Light by an Ultrasonic Wave with Arbitrary Waveform; On the Theory of Propagation of Plane, Finite Amplitude Waves in a Dissipative Fluid; Optical Method for Ultrasonic Velocity Measurements at Liquid-Solid Boundaries; Notes on Reflection from Liquid-Solid Interfaces (Energy Relations); and Measurement of the Sound Pressure Amplitude in Transparent Solids.

AD-A074 114/0 PC **A03**/MF **A01**
MHD Research Inc Newport Beach CA
Research on Magnetohydrodynamic Sound Transducers.
Final rept.,
E. J. Hellund, J. T. Naff, and R. C. Brumfield. 31 Dec 61, 35p
Contract Nonr-3117(00)

Theoretical and experimental studies as to provide basic information on the generation of sound waves in an electrolyte (such as sea water) by high current pulsing of submerged induction coils. The study shall provide, if possible, the modeling criteria for the applicability of the phenomena to underwater acoustic transducers for use in sonar work.

AD-A074 130/6 PC **A02**/MF **A01**
Columbia Univ Dobbs Ferry NY Hudson Labs
Some Comments on the Sensitivity of Theoretical and Experimental Results.
Technical memo.,
Melvin Klerer. 4 Feb 63, 6p Rept no. TM-70
Contract Nonr-266(84)

This report discusses the sensitivity to a change of parameters displayed by both theoretical and experimental results for acoustic propagation problems.

AD-A074 160/3 PC **A04**/MF **A01**
Johns Hopkins Univ Baltimore MD School of Engineering
Optical Probing of Acoustic Emission Waves.
Final rept. 15 Feb 76-30 Jun 79,
C. Harvey Palmer, and Robert E. Green, Jr. 31 Aug 79, 74p ARO-13666.6-MSX
Grants DAAG29-76-G-0160, DAAG29-78-G-0050

Optical probing is a newly developed technique for quantitative study of acoustic emission. It has great advantages over other techniques, especially piezoelectric probing: it is non-contract and does not disturb the signals, it is absolutely calibrated, has a sensitive area only tens of microns diameter, can make measurements within a millimeter of a source, can be used to probe internally in transparent materials, and has an extremely wide, flat bandwidth. With our optical probe we have measured extremely short rise times, amplitudes of 1 to 10 angstroms, and signals characteristics of their sources-at least in some cases. (Author)

ESDU-78003-A PC**$578.50**
Engineering Sciences Data Unit Ltd., London (England).
Evaluation of the Attenuation of Broad-Band Sound by a Non-Uniform Still Atmosphere.
Data item.
c1978, 65p ISBN-0-85679-228-4
Supersedes ESDU-78003.
For information on availability of series, sub-series, and other individual data items, write NTIS, Attn: ESDU, Springfield, VA. 22161.

This Item provides a means of estimating the attenuation of sound across a frequency band, referred to as band attenuation, by the atmosphere in which the temperature and relative humidity vary along the propagation path. The band attenuation rate is estimated by integrating the discrete frequency attenuation over the appropriate frequency range. Values of discrete frequency attenuation are found using Item No. 78002 which is based on the prediction method given in Derivation 1. Allowance is made for spectrum shape, and guidance is given on the use of a layering technique for the estimation of attenuation when atmospheric properties vary with altitude. The atmospheric layering technique should be used only, when the variation of the atmospheric parameters with altitude is known with sufficient confidence to enable the division of the atmosphere into layers within which temperature and relative humidity vary linearly with altitude. When considering horizontal propagation of sound where the temperature and relative humidity vary along the propagation path, the suggested layering technique can be used by substituting linear distance for altitude. In this case any change in pressure between the layers due to variations in temperature is extremely small and should be neglected. A numerical method for the estimation of the band atmospheric attenuation rate, assuming an ideal filter shape, is given as the recommended prediction procedure. Listings of the programmed method in both Basic and Fortran are provided. To enable a rapid estimate of the

one-third octave band atmospheric attenuation rate to be made, an alternative graphical procedure is provided in Appendix A. A typical application is the correction of aircraft noise measurements to standard atmospheric conditions. (Copyright (c) Engineering Sciences Data Unit Ltd, 1978.)

ESDU-79011 PC$770.50
Engineering Sciences Data Unit Ltd., London (England).
Estimation of Noise Shielding by Barriers.
Data item.
c1979, 41p ISBN-0-85679-255-1
For information on availability of series, sub-series, and other individual data items, write NTIS, Attn: ESDU, Springfield, VA. 22161.

When a barrier is placed between a sound source and an observer, sound reaches the observer by diffraction over the top of the barrier, or round the barrier edges, and by direct transmission through the barrier. In many practical cases the barrier is designed such that the transmission path is so highly attenuated that it may be neglected. Hence this Item is only concerned with the sound reaching the observer via the edge of the barrier. A method is provided for estimating the shielding effect of a barrier in terms of the difference in sound level received at a given location on the side of the barrier remote from the noise source and the sound level received at the same location without the barrier. The sound attenuation due to a barrier is therefore dependent on the redistribution of sound energy by diffraction over the top, and round the edges, of the barrier and the increased propagation losses which result from the change in the length and direction of the sound propagation path due to the presence of the barrier. In the procedure used in this Item for estimating the loss due to diffraction it is assumed that the noise is emitted by a point source and that both the source and observer are at large distances from the diffracting edge relative to the wavelengths of the sound considered. Also it is assumed that barriers are rigid, wedge-shaped (as described below) and have hard surfaces and sharp edges. (Copyright (c) Engineering Sciences Data Unit Ltd, 1979.)

N79-32053/7 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Acoustical Properties of Highly Porous Fibrous Materials.
R. F. Lambert. Jul 79, 68p NASA-TM-80135

Highly porous, fibrous bulk sound absorbing materials are studied with a view toward understanding their acoustical properties and performance in a wide variety of applications including liners of flow ducts. The basis and criteria for decoupling of acoustic waves in the pores of the frame and compressional waves in the frame structure are established. The equations of motion are recast in a form that elucidates the coupling mechanisms. The normal incidence surface impedance and absorption coefficient of two types of Kevlar 29 and an open celled foam material are studied. Experimental values and theoretical results are brought into agreement when the structure factor is selected to provide a fit to the experimental data. A parametric procedure for achieving that fit is established. Both a bulk material quality factor and a high frequency impedance level are required to characterize the real and imaginary part of the surface impedance and absorption coefficient. A derivation of the concepts of equivalent density and dynamic resistance is presented.

N79-32055/2 PC **A07**/MF **A01**
Kansas Univ. Center for Research, Inc., Lawrence.
Acoustic Plane Waves Normally Incident on a Clamped Panel in a Rectangular Duct.
H. Unz, and J. Roskam. Aug 79, 130p NASA-CR-162278, KU-FRL-417-11
Grant NSG-1301

The theory of acoustic plane wave normally incident on a clamped panel in a rectangular duct is developed. The coupling theory between the elastic vibrations of the panel (plate) and the acoustic wave propagation in infinite space and in the rectangular duct is considered. The partial differential equation which governs the vibration of the panel (plate) is modified by adding to its stiffness (spring) forces and damping forces, and the fundamental resonance frequency and the attenuation factor are discussed. The noise reduction expression based on the theory is found to agree well with the corresponding experimental data of a sample aluminum panel in the mass controlled region, the damping controlled region, and the stiffness controlled region. All the frequency positions of the upward and downward resonance spikes in the sample experimental data are identified theoretically as resulting from four cross interacting major resonance phenomena: the cavity resonance, the acoustic resonance, the plate resonance, and the wooden back panel resonance.

N79-32056/0 PC **A09**/MF **A01**
Hersh Acoustical Engineering, Chatsworth, CA.
Effect of Grazing Flow on the Acoustic Impedance of Helmholtz Resonators Consisting of Single and Clustered Orifices.
Final Report.
A. S. Hersch, and B. Walker. Aug 79, 183p
NASA-CR-3177
Contract NAS3-19745

A semiempirical fluid mechanical model is derived for the acoustic behavior of thin-walled single orifice Helmholtz resonators in a grazing flow environment. The incident and cavity sound fields are connected in terms of an orifice discharge coefficient whose values are determined experimentally using the two-microphone method. Measurements show that at high grazing flow speeds, acoustical resistance is almost linearly proportional to the grazing flow speed and almost independent of incident sound pressure. The corresponding values of reactance are much smaller and tend towards zero. For thicker-walled orifice plates, resistance and reactance were observed to be less sensitive to grazing flow as the ratio of plate thickness to orifice diameter increased. Loud tones were observed to radiate from a single orifice Helmholtz resonator due to interaction between the grazing flow shear layer and the resonator cavity. Measurements showed that the tones radiated at a Strouhal number equal to 0.26. The effects of grazing flow on the impedance of Helmholtz resonators consisting of clusters of orifices was also studied. In general, both resistance and reaction were found to be virtually independent of orifice relative spacing and number. These findings are valid with and without grazing flow.

N79-32057/8 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Evaluation of a Vortex Model of Turbulent Cavity Flow.
J. C. Hardin, and P. J. W. Block. Sep 79, 47p
NASA-TP-1505, L-12684

A two dimensional discrete vortex model is applied to turbulent flow over a cavity at a Reynolds number based on cavity half length of approximately 500,000. These model predictions are compared with experimental data on a time average and on a spectral basis. The comparisons indicate that the vortex model reproduces the mean velocity profiles of this complex flow, while the turbulent intensity and Reynolds stress profiles are overpredicted in magnitude. Spectral analyses show that the vortex model introduces unrealistic low frequency power which becomes less dominant as the model becomes more disordered. The spectral power distribution of the model in this state is nearly in agreement with that of the data, somewhat too low at the higher frequencies and too high at the lower frequencies. The model is shown to be capable of reproducing the cavity feedback oscillation phenomenon.

PB80-103807 Not available NTIS
National Bureau of Standards, Washington, DC.
Regulations of New Products Noise Emission.
Final rept.,
D. R. Flynn. Jan 79, 8p
Pub. in Handbook of Noise Control, Chapter 41, p41-1-41-8, Jan 79.

This publication is a short book chapter for The Handbook of Noise Control, Second Edition (McGraw-Hill). A description is given of existing and pending Federal regulations on the noise emission from new products.

20B. Crystallography

AD-A073 983/9 Not available NTIS
Princeton Univ NJ Dept of Electrical Engineering
Calculation of Low-Energy-Electron-Diffraction Intensities from ZnO (1010). II. Influence of Calculational Procedure, Model Potential, and Second-Layer Structural Distortions,
C. B. Duke, R. J. Meyer, A. Paton, and P. Mark.
24 Mar 78, 16p ARO-14710.8-EL
Grants DAAG29-77-G-0116, NSF-ENG75-18529
Availability: Pub. in Physical Review B, v18 n8 p4225-4240, 15 Oct 78 (No copies furnished by DDC).

No abstract available.

20C. Electricity and Magnetism

AD-A074 109/0 PC **A02**/MF **A01**
Navy Electronics Lab San Diego CA
Horizontal Electric Doublet in a Semi-Infinite Dissipative Medium,
R. H. Lien. 19 Apr 51, 21p

No abstract available.

20D. Fluid Mechanics

AD-A073 836/9 PC **A03**/MF **A01**
Minnesota Univ Minneapolis St Anthony Falls Hydraulic Lab
An Experimental Investigation of the Effect of Drag Reducing Polymer Additives on Surface Pressure Fluctations on Bodies of Revolution with Rough Surfaces Moving through Water.
Final rept. 1 May 77-30 Apr 78,
Edward Silberman. May 78, 40p Rept no. 172
Contract N00014-77-C-0356

A sound detector in the surface of a moving body receives not only sound signals radiated from a distant source but also detects pressure fluctuations originating in the turbulent boundary layer of the fluid surrounding the body. The purpose of the present work was to assess the magnitude of the surface pressure fluctuations on a body moving in water and in water with polymer additive under nearly zero pressure gradient conditions. Measurements were made using a single transducer in the surface of an axi-symmetric body. Both smooth and grit-roughened surfaces were used. Mean square pressure fluctuation amplitudes were measured as a function of frequency, non-dimensionalized, plotted, and compared with some results obtained by others in both water and air. It was concluded that the addition of roughness to a smooth surface increases the amplitude at the peak of the spectrum and at all lower frequencies. Polymer additive in the water has just the opposite effect on a rough-surfaced body, decreasing the amplitude at the peak and at all lower frequencies, the reduction increasing monotonically with drag reduction. There was little or no effect at high frequencies attributable to either roughness or polymer additive, but it must be noted that the transducer used was too large to obtain a true measure of amplitude at the highest frequencies. The peak of the spectrum in water appears to have a somewhat higher amplitude than it does in air. (Author)

AD-A073 848/4 PC **A03**/MF **A01**
Jaycor Alexandria VA
Continued Development of Fluid Dynamics Models.
Final rept. 1 Apr 78-1 Apr 79,
Philip J. Moffa, and Simon W. Chang. 6 Apr 79, 36p
Contract N00173-78-C-0421

A program of continuing development of several fluid dynamic models has been carried out for NRL by JAYCOR. Specifically, major developments and modifications of several large computer codes have been accomplished. This has been done to provide NRL with an expanded capability of modelling diverse physical phenomena, all of which are amenable to analysis utilizing advanced hydrodynamic computational techniques.

AD-A073 954/0 PC **A05**/MF **A01**
Stanford Univ CA Dept of Mechanical Engineering

Instrumentation for the Measurement of Turbulence Components in a Three-Dimensional Flow Field.
Final rept. 1 May-30 Nov 78,
M. Frota, and R. J. Moffat. Aug 79, 76p AFOSR-TR-79-0957
Grant AFOSR-78-3597

A three-coordinate hot-wire anemometer system for turbulence measurements has been implemented for use in three-dimensional flows. High-speed analog processing produces the turbulence data in real time, including all double correlations. A 2-mm diameter miniature probe has been developed. The system has been tested in reference flows and used in a curved boundary layer. (Author)

AD-A074 057/1 PC **A03**/MF **A01**
Ohio State Univ Research Foundation Columbus
On the Multiple Scattering of Waves from Obstacles with Solid-Fluid Interfaces.
Rept. for 1 Oct 78-31 Jul 79,
Bo Peterson, V. V. Varadan, and V. K. Varadan. Jul 79, 29p
Contract N00014-78-C-0559

The purpose of this article is to present a T-matrix formalism for elastic wave scattering by multilayered regions with solid-fluid interfaces. Here the layers are not necessarily consecutively enclosing and thus in some regions there may be several different scatterers. We are using the Green's dyadic in an integral representation although the T-matrix can be obtained without using and Green's dyadic.

AD-A074 062/1 Not available NTIS
Minnesota Univ Minneapolis Dept of Aerospace Engineering and Mechanics
Free Surface Problems in Rheological Fluid Mechanics,
D. D. Joseph, and G. S. Beavers. 18 Feb 77, 21p ARO-12754.10-E
Grant DAAG29-76-G-0047
Presented at the Euromech Colloquium (79th), Darmstadt, 7-10 Sep 76.
Availability: Pub. in Rheologica Acta, v16 n2 p69-89 1977 (No copies furnished by DDC).

No abstract available.

AD-A074 065/4 Not available NTIS
TRW Systems and Energy Redondo Beach CA
Analytic Modeling of Turbulent Shear Flow with Chemical Reaction,
William B. Bush, and Francis E. Fendell. 25 Apr 77, 17p
Contract DAAG29-74-C-0023, Grant NSF-ENG74-11828
Prepared in cooperation with California Univ., San Diego, La Jolla.
Availability: Pub. in Progress in Astronautics and Aeronautics, v58 p3-18 1978 (No copies furnished by DDC).

No abstract available.

AD-A074 253/6 Not available NTIS
Illinois Univ at Urbana-Champaign Dept of Mechanical and Industrial Engineering
Inviscid Solution for the Problem of Free Overfall,
W. L. Chow, and T. Han. Apr 78, 5p ARO-13510.7-E
Grant DAAG29-76-G-0199
Presented at the Winter Annual Meeting of the American Society of Mechanical Engineers, San Francisco, CA. 10-15 Dec 78.
Availability: Jnl. of Applied Mechanics, v46 n1 p1-5 Mar 79 (No copies furnished by DDC).

No abstract available.

AD-A074 328/6 Not available NTIS
Minnesota Univ Minneapolis Dept of Aerospace Engineering and Mechanics
Experiments on Free Surface Phenomena,
G. S. Beavers, and D. D. Joseph. 20 Jul 78, 30p ARO-16036.1-E
Contract DAAG29-79-C-0038
Presented at the IUTAM Symposium on Non-Newtonian Fluid Mechanics, 28 Aug-1 Sep 78, Louvain-La-Neuve (Belgium).
Availability: Pub. in Jnl. of Non-Newtonian Fluid Mechanics, v5 p323-352 1979 (No copies furnished by DDC).

No abstract available.

DOE-tr-61 PC **A10**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorentwicklung.
Direct Numerical Simulation of Turbulent Velocity, Pressure, and Temperature Fields in Channel Flows.
G. Groetzbach. 15 Sep 78, 217p
C KFK--2426, October 1977.Work performed under United States--W. Germany Fast Reactor Exchange Program.
U.S. Sales Only.

For the simulation of nonsteady, three-dimensional, turbulent flow- and temperature-fields in channel flows of fluids with constant properties a method is presented which is based on a finite difference scheme of the complete conservation equations for mass, momentum, and enthalpy. The fluxes of momentum and heat within the grid cells are described by subgrid scale models. The subgrid scale model for momentum introduced here is for the first time applicable to small Reynolds numbers, rather coarse grids, and channels with space-dependent roughness distributions. The new developed subgrid scale model for temperature also takes the influence of the molecular Prandtl number into consideration. For Prandtl numbers of about one, the theoretical model confirms the empirically derived values for the turbulent subgrid scale Prandtl number, which are currently used by other authors. For very small molecular Prandtl numbers of liquid metals, the model shows that the total resolution of all relevant temperature fluctuations can be achieved on the basis of presently realizable grids. The method is realized in the computer code TURBIT-2. It can be used for the simulation of laminar flows in plane channels and annuli as well as for turbulent flows with Reynolds numbers larger than about 10 exp 4 . The numerical results for the flow field show only a small influence of the model parameters. For smooth, rough, and partly roughened channels with secondary flows the agreement with experimental results is fairly good even when rather coarse grids are used. The temperature fields simulated are very insensitive to the parameters of the model. The numerical results are in good agreement with consistent, reliable experimental results. (ERA citation 04:049942)

NUREG/CR-0971 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
A Stability Enhancing Two-Step Method for One-Dimensional Two-Phase Flow.
Informal rept.,
John H. Mahaffy. Aug 79, 19p LA-7951-MS
Contract W-7405-eng-36

Over the last few years new approaches to numerical modeling of two-phase flow have been required for improved analysis of loss-of-coolant accidents (LOCAs) in nuclear reactors. The most successful of the current generation of numerical schemes for handling these problems has been the semi-implicit method. The major weakness of the semi-implicit approach is that its time step stability limit can result in prohibitively high computation costs for typical LOCA conditions. One solution to this problem is to apply a fully implicit numerical method to those regions which would most severely limit the time step size, and the less expensive semi-implicit method to the remainder of the system. Another simpler solution is to use the stability enhancing two-step method described in this report. This approach eliminates the stability restriction of the semi-implicit method, but requires significantly less new coding and computation cost than adding a fully implicit scheme.

N79-31524/8 PC **A09**/MF **A01**
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Goettingen (Germany, F.R.).
Contributions to Fluid Mechanics Beitraege Zur Stremungsmechanik.
1978, 184p
Language in German.

Ten articles are presented which cover a wide spectrum of research in the field of theoretical and experimental fluid mechanics. The titles of the articles are: (1) Development of Data Acquistition and Processing Systems for a 3 mm Wind Tunnel; (2) Airfoil Lift in Compressible Subsonic Flow with Separation; (3) Sound Generation in an Induction Motor Fan; (4) The Hypersonic Vacuum Tunnel; (5) Remarks on a Hydraulic Ram; (6) Experimental and Theoretical Pressure Distribution on the Ellipsoid of Revolution; (7) Theoretical Study of the Effect of the Pressure Fluctuation Component in Three Dimensional Turbulent Boundary Layers; (8) Variations of a Parallel Flow Along a Flat Plate Due to a Normally Directed Free Jet; (9) Effects of Solid Boundary Surface in a Flow about a Profile with Separation; and (10) Introduction to the Electronic Data Processing to Improve Cataloging in the Library of the Aerodynamic Testing Facilities in Goettingen.

N79-31525/5 PC **A03**/MF **A01**
Southampton Univ. (England). Dept. of Aeronautics and Astronautics.
A Study of Coherent Structures in Axisymmetric Jets Using an Optical Technique.
G. T. Kalghatgi. Jun 79, 40p AASU-341, LOG-J11122
Subm-Backup Document for AIAA Synoptic Scheduled for Publication in AIAA Journal in March, 1980.

An optical method using the deflection of laser beams caused by density gradients in the flow was used to study coherent structures in the first six diameters of five axisymmetric jets of different velocities and densities. Quantitative information about the development of the coherent structures with axial distance was deduced and is presented in terms of the average interval between successive events, the convection velocity, and the chances of survival of individual events. It was found that coherence decreases and the average interval between successive events increases with increasing axial distance. The average convection velocity of the structures increases with axial distance initially and reaches a somewhat steady value beyond two diameters. It is shown that the most numerous interactions occur in the region before one nozzle diameter.

N79-31526/3 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Free Jet Phenomena in a 90 Degree-Sharp Edge Inlet Geometry.
R. C. Hendricks. 1979, 30p NASA-TM-79229, E-131
Conf-Presented at Intern. Cryogenic Engr. Conf. And the Intern. Cryogenic Materials Conf., Madison, Wis., 21-24 Aug. 1979; Sponsored by NBS.

Under certain conditions, inlets with a sharp edge or geometric corner were shown to exhibit sufficiently strong separation effects to permit the working fluid to flow through the duct as if it were a free jet. Mass limiting flow data and associated pressure profiles for tubes of 53, 64, 73, and 105 length/diameter with a 90 deg sharp edge or orifice type inlet were taken and compared to Borda type inlet data to determine bounds of the free jet phenomena. For smooth tubes the limits appear to be one dimensional and dependent only on inlet stagnation conditions. Similar free jet effects were found for fluid hydrogen indicating that fluid jetting may common to all fluids flowing through 90 deg sharp edge inlet geometries.

N79-31527/1 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
A Reduced Volumetric Expansion Factor Plot.
R. C. Hendricks. 1979, 29p NASA-TM-79240, E-148
Conf-Presented at Cryogenic Engr. Conf. And the Intern. Cryogenic Materials Conf., Madison, Wis., 21-24 Aug. 1979.

A reduced volumetric expansion factor plot was constructed for simple fluids which is suitable for engineering computations in heat transfer. Volumetric expansion factors were found useful in correlating heat transfer data over a wide range of operating conditions including liquids, gases and the near critical region.

N79-31534/7 PC **A20**/MF **A01**
European Space Agency, Paris (France). Hermann-Foettinger Inst. fuer Thermo- und Fluiddynamik.

Contributions on Transport Phenomena in Fluid Mechanics and Related Topics.
W. Haase. Mar 79, 455p ESA-TT-498, DLR-FB-77-16
Tran-Transl. Into English from "Beitraege Zu Transportphaenomenen in der Stroemungsmechanik und Anverwandten Gebieten', Dfvlr, Berlin Report Dlr-FB-77-16, Mar. 1977. Misc-Original Report in German Previously Announced as N79-12367. Misc-Original German Report Available from DFVLR, Cologne Dm 95,40.

No abstract available.

PB80-103831 Not available NTIS
National Bureau of Standards, Washington, DC.
Grid Turbulence in Air and Water.
Final rept.,
F. N. Frenkiel, P. S. Klebanoff, and T. T. Huang. Sep 79, 12p
Pub. in Physics of Fluids 22, n9, p1606-1617, Sep 79.

An experimental comparison of grid turbulence performed in a wind tunnel and in a water tunnel is described. The measurements were made in the initial stage of decay with mesh Reynolds numbers ranging from 12800 to 81000. Hot-wire and hot-film instrumentation combining analog and digital computing methods were used to measure higher-order correlations of the longitudinal component of turbulent velocity and higher-order moments of longitudinal turbulent velocity gradients. A comparison of the latter is obtained for an increase in Reynolds number without having to alter the flow geometry. Apart from the intrinsic interest of such measurements in water, the results show the non-Gaussian character of the turbulent fluctuation and compare the behavior of higher-order moments of turbulent velocity gradients to theoretical considerations for the small scale turbulent structure.

UCRL-52792 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
VISAR Analysis at the Lawrence Livermore Laboratory with the Four-Detector System.
D. R. Goosman, and N. L. Parker. 22 Jun 79, 21p
Contract W-7405-ENG-48

A detailed description is presented of the analysis of velocity-vs-time data taken with LLL's four-phototube VISAR system. Separate sections deal with a general analysis of on-axis rays when only one frequency of reflected laser light is present, a simplified analysis where two distinct frequencies are present and the rays are still on axis, and a discussion of the effects of off-axis rays. The description is given in such a manner that a VISAR user could employ the formulae in this report to directly analyze data. Unlike previous literature on the VISAR, this analysis does not assume that the mirrors are set at the best fringe contrast position. (ERA citation 04:050678)

20E. Masers and Lasers

AD-A073 888/0 PC **A04**/MF **A01**
Naval Postgraduate School Monterey CA
Stimulated Emission by Relativistic Electrons Traversing a Periodic Magnetic Field.
Master's thesis,
Robert Boyce Ellis. Jun 79, 72p

A historical survey of scientific developments predating the free electron laser (FEL) concept is presented. A general theory of operation of the FEL is discussed. The use of electromagnets to generate a static periodic magnetic field of alternating polarity (as a pump wave source) is proposed. Preliminary measurements with respect to the proposed electromagnet design are analyzed. (Author)

AD-A073 949/0 Not available NTIS
RCA Labs Princeton NJ
Beamwidth Approximations for the Fundamental Mode in Symmetric Double-Heterojunction Lasers,
Dan Botez, and Michael Ettenberg. 8 Jun 78, 4p
DAAG29-77-C-0021, ARO-14755.9-EL
Availability: Pub. in IEEE Jnl. of Quantum Electronics, vQE-14 n11 p827-830 Nov 78. (No copies furnished by DDC).

No abstract available.

AD-A074 009/2 Not available NTIS
California Univ Berkeley Dept of Electrical Engineering
Simmer-Enhanced Flashlamp-Pumped Dye Laser,
T. K. Yee, B. Fan, and T. K. Gustafson. 15 Jan 79, 2p ARO-12963.7-P
Contracts DAHC04-75-C-0095, NSG-2151
Availability: Pub. in Applied Optics, v18 n8 p1131-1132, 15 Apr 79. (No copies furnished by DDC).

No abstract available.

AD-A074 126/4 PC **A05**/MF **A01**
Hughes Aircraft Co Culver City CA Electro-Optical and Data Systems Group
High Energy Optical Resonance Transfer Laser Study. Volume I. Laboratory Experiments.
Final technical rept. 24 Jul 78-23 Jun 79,
P. Baily, J. Finzi, C. Lovejoy, and J. Wang. Aug 79, 82p Rept nos. HAC-FR-79-73-999-VOL-1, HAC-REF-E2380-VOL-1
Contract N00173-78-C-0470, DARPA Order-2062
See also Volume 2, AD-C018 939 and AD-A065 926.

This report describes characterization experiments investigating an HF intramolecular Optical resonance Transfer Laser (ORTL), with variation in pump laser characteristics, ORTL volume and ORTL medium composition, pressure, and flow velocity. Input coupling, conversion, and overall efficiency were characterized in several different geometries. Maximum values of 83 per cent for conversion efficiency and 29 per cent for overall efficiency were observed. Initial temporal measurements revealed no dynamic feedback interaction in the intra-cavity configuration. Diffraction limited ORTL beam quality was observed. (Author)

AD-A074 287/4 PC **A03**/MF **A01**
TRW Equipment Labs Cleveland OH Materials Technology Dept
FRS Composites For Advanced Gas Turbine Engine Components.
Final rept.,
D. M. Essock. May 79, 46p ER-7969-F, NADC-77015-30
Contract N62269-77-C-0217

A number of FRS design concepts involve use of varying volume fraction of fiber, varying fiber diameter, and cross-ply construction. Key properties of such composites were evaluated to determine whether there are any adverse effects. Based upon elevated temperature tensile, creep, and thermal fatigue testing, equivalent mechanical properties are obtained if placement of plies is varied in a symmetrical layup. (Author)

AD-A074 368/2 PC **A04**/MF **A01**
Naval Research Lab Washington DC
Analytic Analysis of Linear Growth Rates of Gyrotron for TE(ins) Mode with Zero-Temperature Beam Electrons.
Memorandum rept.,
Joon Y. Choe, and Saeyoung Ahn. 29 Jun 79, 57p NRL-MR-4035, AD-E000 324

The approximate expression for the growth rate of the transverse electric (TE) mode with the azimuthal mode number, 'l', the radial mode number 'n', and the magnetic harmonic number 's' of the electron cyclotron maser instability with zero-temperatured beam electrons is derived and analytically examined. It has been found that there exist two branches of instabilities distinguished by their axial wavenumbers; the short and the long wavelength modes, and the estimates of their growth rates have been obtained. With maximization processes of the growth rates, the optimum conditions on various parameters have been found. In particular, it has been found that 's' equals 'l' mode with the beam center coinciding with the axis yields the highest growth rate. The exponential behavior of the growth with respect to the magnetic harmonic number 's' is also obtained.

N79-32097/4 PC **A03**/MF **A01**
Florida Univ., Gainesville. Dept. of Nuclear Engineering Sciences.
Research on Radiation Induced Laser Plasmas.
Semiannual Report.
R. T. Schneider, M. J. Rowe, B. D. Carter, R. A. Walters, and J. D. Cox. Sep 79, 43p NASA-CR-162170
Grant NSG-1586

The development of high power nuclear pumped lasers is discussed. The excitation mechanism of continuous wave (CW) HeNe nuclear pumped lasers is studied and a CO2 nuclear pumped laser is used to demonstrate the CW output in the order of watts. The assumption that high power densities are only achievable by volume fission fragment sources is used to identify laser gases which are compatible with UF6 by excited states lifetime measurements. The examination of Xe2, XeF, and KrF under nuclear irradiation to determine if they are good candidates for nuclear-pumped lasers is described.

PAT-APPL-6-052 162 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Optical Beam Mode Controlled Laser System.
Patent Application,
Filed 26 Jun 79, 21p AD-D006 310/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This patent application describes an optical beam mode controlled high power laser system having a resonator which incorporated therein, as one of the reflective elements, a high efficiency diffraction grating. Impinging upon the diffraction grating is not only the high power resonator laser beam, but also an injected mode controlling laser beam of preselected wavelength. Each beam is directed at the diffraction grating at a predetermined angle in order for the grating to direct away therefrom a combined beam of radiant energy having high power and being locked to the preselected wavelength of the injected laser beam. It is this high power laser beam of preselected wavelength which is output from the laser system. (Author)

PATENT-4 102 988 Not available NTIS
Department of the Army Washington DC
Cyano Compounds as Fuels for HF or DF Lasers.
Patent,
Pasquale Martignoni, James A. Murfree, Jr., William M. Chew, and Orval E. Ayers. Filed 3 Oct 77, patented 25 Jul 78, 7p AD-D006 322/2, PAT-APPL-838 519
Supersedes PAT-APPL-838 519-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A cyano compound fuel selected from the group consisting of dicyanoacetylene (DCA), tetracyanoethylene (TCE), and tetracyanoethylene oxide (TCEO) when reacted with an oxidizer compound selected from the group consisting of fluorine (F2), nitrogen trifluoride (NF3), chlorine trifluoride (ClF3), chlorine pentafluoride (ClF5), and tetrafluorohydrazine (N2F4) produces the F atom concentration required for either HF or DF lasers. The reaction is accomplished in the presence of a diluent gas selected from nitrogen and helium. No deactivation species are among the gaseous species produced which include CF4, F atoms, and N2; therefore, deactivation of the excited molecules, either HF or DF, which are responsible for the lasing in a HF or DF laser is prevented. A higher performance of the laser device can be achieved. (Author)

PATENT-4 127 826 Not available NTIS
Department of the Army Washington DC
Gain Spike and Mode Control for Spiked Lasers.
Patent,
Charles M. Cason, III. Filed 13 May 77, patented 28 Nov 78, 5p AD-D006 332/1, PAT-APPL-796 581
Supersedes PAT-APPL-796 581-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a laser system using a cw HeNe laser for transmitting a beam through a dichroic into an unstable resonator. A second laser, a cw CO2 laser, has its beam transmitted through the dichroic to follow the HeNe beam into the unstable resonator laser aperture. The resonator's

secondary and primary mirrors are adjusted into a parallel orientation which gives a series of circles in both laser beams. The gain-spike is suppressed to eliminate air breakdown. (Author)

PATENT-4 129 836 Not available NTIS
Department of the Army Washington DC
Frequency Stable Boron Nitride Channel Laser.
Patent,
Aristotle Papayoanou. Filed 4 Apr 77, patented 12 Dec 78, 8p AD-D006 334/7, PAT-APPL-784 084
Supersedes PAT-APPL-784 084-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a CW waveguide channel gas laser constructed from boron nitride which, due to its high thermal conductivity and extremely low thermal expansivity, provides increased frequency stability. (Author)

20F. Optics

AD-A073 853/4 PC **A09**/MF **A01**
Visidyne Inc Burlington MA
Rocketborne Laser Backscatter Experiment.
Final rept. 6 May 76-15 Feb 79,
O. Shepherd, A. G. Hurd, W. H. Sheehan, and R. D. Bucknam. 15 Mar 79, 180p VI-475, AFGL-TR-79-0081
Contract F19628-76-C-0253

A previously flown rocket payload designed to measure atmospheric density in the thermosphere through Rayleigh backscatter of a dye laser signal was modified and refurbished. In its earlier field test the payload failed to provide any data, apparently because of a timing problem. Relaunched, the laser failed to operate because of a minor component failure. However, measured background intensities were orders of magnitude higher than anticipated. The source of the background signals has not been positively identified since the rocket aspect data have not been finalized. The most likely appears to be scattering from the earth's atmosphere illuminated by the below horizon sun.

AD-A073 872/4 PC **A03**/MF **A01**
Naval Ocean Research and Development Activity NSTL Station MS
Operating Scenario for a Hydrographic Airborne Laser Sounder (HALS).
Interim rept.,
H. J. Byrnes. May 79, 35p Rept no. NORDA-TN-34

This note is intended to acquaint interested parties with the anticipated deployment of the Hydrographic Airborne Laser Sounder (HALS). Data acquisition, data processing, data reduction rationale, data density, test results, and environmental considerations are covered. The document is intended primarily as presolicitation information for HALS procurement. (Author)

AD-A073 937/5 Not available NTIS
Illinois Univ at Urbana-Champaign Dept of Electrical Engineering
Picosecond Far Infrared Pulses: Some Approaches,
T. A. DeTemple. 1979, 8p ARO-15261.3-P
Contract DAAG29-77-C-0025
Availability: Pub. in Proceedings of the International Conference on Lasers, p104-110 1978 (No copies furnished by DDC).

No abstract available.

AD-A073 943/3 Not available NTIS
California Inst of Tech Pasadena Dept of Electrical Engineering
Transient Four-Wave Mixing and Real Time Holography in Atomic Systems,
Amnony Yariv, and John Auyeung. 1 Sep 78, 5p ARO-15171-8-P
Contract DAAG29-77-G-0168
Availability: Pub. in IEEE Jnl. of Quantum Electronics, vQE-15 n4 p224-228 Apr 79 (No copies furnished by DDC).

No abstract available.

AD-A073 945/8 Not available NTIS
California Inst of Tech Pasadena
Phase-Conjugate Optics,
John AuYeung, and Amnon Yariv. 1979, 5p ARO-15171.6-P
Grant DAAG29-77-G-0168
Availability: Pub. in Optics News, Spring 1979. (No copies furnished by DDC).

No abstract available.

AD-A073 952/4 Not available NTIS
RCA Labs Princeton N J
Near and Far-Field Analytical Approximations for the Fundamental Mode in Symmetric Waveguide DH Lasers,
Dan Botez. 1978, 27p ARO-14755.5-EL
Contract DAAG29-77-C-0021
Availability: Pub. in RCA Review, v39 p577-603 Dec 78. (No copies furnished by DDC).

No abstract available.

AD-A074 034/0 PC **A02**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Linear Scan Control of Tunable Lasers Using a Scanning Fabry-Perot.
Journal article,
Michael J. Coulombe, and Alan S. Pine. 31 Oct 78, 9p JA-4897, ESD-TR-79-173
Contract F19628-78-C-0002
Pub. in Applied Optics, v18 n10 p1505-1512, 15 May 79.

No abstract available.

AD-A074 121/5 Not available NTIS
Texas Tech Univ Lubbock Dept of Chemistry
Picosecond Emission Spectroscopy,
G. Wilse Robinson, John M. Morris, Raymond J. Robbins, and Graham R. Fleming. 1977, 13p ARO-14470.5-C
Grants DAAG29-76-G-0289, DAAG29-77-G-0028
Prepared in cooperation with Melbourne Univ., Parkville (Australia). Dept. of Physical Chemistry, and the Royal Inst., London (England).
Availability: Pub. in Proceedings of the Society of Photo-Optical Instrumentation Engineers Held in San Diego, CA on 23-24 Aug 77, v113. Advances in Laser Spectroscopy 1, p13-24 1977 (No copies furnished by DDC).

No abstract available.

AD-A074 249/4 Not available NTIS
Alabama Univ in Huntsville Dept of Physics
Explanation of the Experimental Results of Light Backscattered from a Very Rough Surface,
C. C. Sung, and W. D. Eberhardt. 3 Oct 77, 6p ARO-13913.5-P
Grant DAAG29-77-G-0051
Availability: Pub. in Jnl. of the Optical Society of America, v68 n3 p323-328 Mar 78 (No copies furnished by DDC).

No abstract available.

AD-A074 351/8 PC **A02**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Statistics of Optical Radiation Scattered from Rough Surfaces.
Memorandum rept.,
Paul H. Deitz, and Tommy E. Buder. Jul 79, 15p ARBRL-MR-02929, AD-E430 293

When coherent illumination is scattered from a rough surface, the resulting pattern of light (speckle pattern) has stochastic variations in irradiance which relate to the scattering surface itself. A computer simulation for a particular scattering geometry has been made in which four statistical parameters of speckle patterns have been related to various pairwise combinations of surface height and correlation interval for a gaussian scattering surface. The corresponding optical analogue of this simulation has potential application to studies of gun erosion.

LA-UR-79-1474 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Broadly Tunable Picosecond IR Source.
A. J. Campillo, R. C. Hyer, and S. L. Shapiro. 1979, 18p CONF-790529-4
Contract W-7405-ENG-36
Conference on Optics, Los Alamos, NM, USA, 23 May 1979.

A completely grating tuned (1.9 to 2.4 mu m) picosecond traveling wave IR generator capable of controlled spectral bandwidth operation down to the Fourier Transform limit is reported. Subsequent down conversion in CdSe extends tuning to 10 to 20 mu m. (ERA citation 04:050409)

LA-7850-T PC **A06**/MF **A01**
Los Alamos Scientific Lab., NM.
Nonlinear Optics: Parametric Amplification at 16 Micrometers and Oscillator Mode Competition.
R. G. Wenzel. May 79, 111p
Contract W-7405-ENG-36
Thesis.

Parametric amplification in the 16- mu m region in Brewster-cut CdSe is reported. An HF pump laser with a flat radial intensity profile was used, thereby eliminating the need for confocal focusing of pump and signal beams. Plane-wave analysis is therefore used. The gain bandwidth was determined and found to be in agreement with theory. The second-order nonlinear susceptibility was measured for the first time at 16 mu m through Miller's delta . The frequency distributions for a parametric oscillator fitted with sapphire and ZnSe etalons have been measured and interpreted in terms of the probability of oscillation for specific cavity modes. A theoretical model is developed to calculate these probabilities. It involves finding local approximate analytical solutions of the coupled mode amplitude equations of A. Yariv and W.H. Louisell in Theory of the Optical Parametric Oscillator, IEEE JQE, QE-2, 418 (1966). The solutions are then interpreted statistically. Predictions of the model are compared with the measurements. Reasonable agreement is found. (ERA citation 04:050440)

N79-32096/6 PC **A06**/MF **A01**
Rank Optics, Leeds (England).
Design Study for a Fiber Optics Branching Coupler.
Final Report.
P. S. Cain, N. G. Robertson, and J. M. Russell. Sep 78, 114p RO-978, ESA-CR(P)-1196
Contract ESTEC-3340/77-NL-AK(SC)

Various possibilities for achieving a single fiber T-coupler and a multiline branching coupler for space applications were examined and from those reviewed the most promising types meriting further study were selected. Development models were designed, manufactured, tested, and analyzed. Engineering models of the couplers which were considered to be space qualifiable were prepared. The models, however, were not to be type tested. Drawings of the developed couplers are included.

PAT-APPL-6-052 163 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Light Spot Position Sensor for a Wavefront Sampling System.
Patent Application,
Richard H. Pohle. Filed 26 Jun 79, 15p AD-D006 311/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This patent application describes a light spot position sensor for a wavefront sampling system having a crossed Ronchi chopper disk interposed between the diffracted laser beams of the wavefront sampling system and the intensity detectors located within the wavefront sampler. The crossed Ronchi chopper disk interrupts, at a predetermined interval, the diffracted beam of light which focuses as a spot on the disk. The relative position of the sopt(s) is determined with respect to an alignment beam, the position of which is known. By means of appropriate electronics the electronic phase of each frequency of the spot is detected and compared with the phase of each frequency of the known spot to provide a two axis spot position location. (Author)

PATENT-4 144 464
Not available NTIS
Department of Energy, Washington, DC.

Device and Method for Noresonantly Raman Shifting Ultraviolet Radiation.
Patent,
T. R. Loree, and D. L. Barker. Filed 25 Jan 78, patented 13 Mar 79, 8p PAT-APPL-872 292
Supersedes PAT-APPL-872 292-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention discloses a device and method for nonresonantly Raman shifting broad band uv excimer laser radiation, which enhances preselected Stokes signals by varying the pressure of the Raman scattering medium, the focal interaction length of the incident radiation within the Raman scattering medium and its power density level. Gaseous molecular H sub 2 , D sub 2 , CH sub 4 (methane), HD and mixes thereof, and liquid N sub 2 are used as the Raman scattering medium to frequency shift the outputs of high power KrF and ArF lasers. A cable fed discharge with an unstable resonant cavity configuration is utilized to produce the output laser power levels required for operation. (ERA citation 04:050448)

PATENT-4 159 576 Not available NTIS
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Radiation Shadow Indicator.
Patent,
R. A. Campbell. Filed 31 Oct 78, patented 3 Jul 79, 8p N79-29037/5, PAT-APPL-956 167
Supersedes PAT-APPL-956 167-78.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A radiation shadow indicator, having a slight tube for sighting shadow-casting objects along a sighting axis, is described. The indicator includes a system of gimbals mounting the tube for angular movement so that the sighting axis thereof may be caused to follow the apparent diurnal movement of celestial objects at various seasons of the year. Position indicators are provided for instantaneous readout of angular positions of the gimbal device which, in turn, correspond to positions of the sighting axis at given seansons and/or times of day in relation to the location of the indicator on the surface of the earth.

PB80-101256 PC **A06**/MF **A01**
National Bureau of Standards, Boulder, CO. National Engineering Lab.
Design of a Reflection Apparatus for Laser Beam Profile Measurements.
Eric G. Johnson, Jr. Jul 79, 122p NBS-TN-1015
Contract CCG-78-109

Measurement of both the irradiance and phase front (the beam profile) in real time from the output of a laser has interest for control of that beam and for efficient energy and economic design of the source and the resulting optical systems. The National Bureau of Standards has begun a program to build a unit that can measure, at numerous wavelengths from 1.06 micrometers to 10.6 micrometers, a selected spatial sample of the beam profile. The design analysis reported here includes: the theory which uses Fourier optics concepts with off-axis reflections and rough surfaces to provide the basis for accurate computer simulation of laser beams; the program, BEAM, which generates the expected behavior of the apparatus under variation of laser wavelength, physical dimensions for curvatures, hologram structure, and changes in positions of the various components; the simulation results which demonstrate the expected characteristics for the apparatus; and the key element in the apparatus, namely the reflection hologram, which requires discussion of the design, construction, and testing of this element. The Hartmann plate method is described briefly so that a comparison between it and the holographic method can be made. The comparison shows why the holographic method is best for a standard for irradiance and phase-front measurements.

PB80-104219 Not available NTIS
National Bureau of Standards, Washington, DC.
Frontiers in Optical Radiation Measurements.
Final rept.,
J. Geist. 1976, 4p
Pub. in Proceedings of Electro-Optical Systems Design Conference - 1976 International Laser Exposition Held at New York, NY. on September 14-16, 1976, p281-284 1976.

Recent progress in optical radiation measurements is reviewed with emphasis on very recent progress in areas currently undergoing significant development. By its nature, the paper must rely on some extent on unpublished material.

PB80-104300 Not available NTIS
National Bureau of Standards, Washington, DC.
Capillary Array: A New Type of Window for the Vacuum Ultraviolet.
Final rept.,
T. B. Lucatorto, T. J. McIlrath, and J. R. Roberts. 15 Jul 79, 5p
Pub. in Applied Optics 18, n14, p2505-2509, 15 Jul 79.

Experiments with optical radiation often require separation of a region of relatively high pressure from a lower pressure region while allowing transmission of radiation between regions. When working with vacuum ultraviolet radiation (VUV) the problem is made more difficult by the small number of transparent materials, there being no bulk materials which transmit at shorter wavelengths than the 1050A cut-off of LiF. In this paper the authors report the successful use of glass capillary arrays combined with differential pumping to sustain large pressure differences with excellent transmission of radiation throughout the VUV region.

UCRL-82595 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Photoacoustic Theory Made Easy.
A. Rosencwaig. 13 Apr 79, 6p CONF-790819-2
Contract W-7405-ENG-48
Topical meeting on photoacoustic spectroscopy, Ames, IA, USA, 1 Aug 1979.

Simple formulas for the photoacoustic effect are derived from basic physical insights. (ERA citation 04:050809)

UCRL-82597 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Photoacoustics: More Than Spectroscopy.
A. Rosencwaig. 13 Apr 79, 5p CONF-790819-4
Contract W-7405-ENG-48
Topical meeting on photoacoustic spectroscopy, Ames, IA, USA, 1 Aug 1979.

Non-spectroscopic applications of the photoacoustic effect are reviewed, and new potentials for such studies are discussed. (ERA citation 04:050810)

20G. Particle Accelerators

BNL-50885 PC **A20**/MF **A01**
Brookhaven National Lab., Upton, NY.
Proceedings of the 1978 ISABELLE Summer Workshop, Upton, New York, July 17–28, 1978.
Feb 79, 456p
Contract EY-76-C-02-0016

Three general areas are covered by the workshop. These are detectors, experimental areas and data handling. Fifty-seven individual items were prepared separately for the data base. Several brief contributions were included in the workshop proceedings but were not prepared separately. (ERA citation 04:050486)

LA-UR-79-1221 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Front-End Data Processing Using the Bit-Sliced Microprocessor.
D. R. Machen. 1979, 6p CONF-790549-4
Contract W-7405-ENG-36
Conference on computerized data - acquisition systems in particle and nuclear physics, Santa Fe, NM, USA, 14 May 1979.

A state-of-the-art computing device, based upon the high-speed bit-sliced microprocessor, was developed into hardware for front-end data processing in both control and experiment applications at the Los Alamos Scientific Laboratory. The CAMAC Instrumentation Standard provides the framework for the high-speed hardware, allowing data acquisition and processing to take place at the data source in a CAMAC crate. 5 figures. (ERA citation 04:050482)

LBL-9152 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Data Acquisition Using PDP-11 and MBD Branch Driver at L.B.L.
E. H. Harvey, Jr. May 79, 7p CONF-790549-10
Contract W-7405-ENG-48
Conference on computerized data - acquisition systems in particle and nuclear physics, Santa Fe, NM, USA, 14 May 1979.

A data acquisition system was designed and preliminary versions implemented for physics experiments at LBL. It utilizes an MBD microprogramed branch driver and a PDP-11 operating under RSM-11M. An MBD executive is used to implement software breakpoints within the MBD. The PDP-11 data acquisition buffer management scheme allows for multiple tasks dynamically accessing the data stream. Emphasis is directed towards future expansions. High data rates are also emphasized. 2 tables. (ERA citation 04:050483)

PATENT-4 121 128 Not available NTIS
Department of the Army Washington DC
Collective Ion Accelerator with Foil-Less Beam Extraction Window.
Patent,
Thomas G. Roberts. Filed 15 Aug 77, patented 17 Oct 78, 6p AD-D006 327/1, PAT-APPL-824 673
Supersedes PAT-APPL-824 673-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Ions are generated in a vacuum condition of an ion accelerator and injected through three aerodynamic windows, to atmospheric pressure. In its travel through the windows the coil provides a magnetic field to prevent the ion beam from dissipating while it is traveling to the atmosphere. (Author)

SAND-79-0597 PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
SNEER: A Digital Computer Program for the Simulation of Charged Particle BEAMS and Electrostatic Lenses.
J. E. Boers. Jul 79, 35p
Contract EY-76-C-04-0789

SNEER has been found to be a powerful tool for the analysis of charged particle beams and trajectories. Inclusion of relativistic trajectory computations and the ability to include dielectrics in the potential relaxation enables the program to handle virtually any type of beam configuration not including a source - such as a cathode. Examples shown here have produced results within a few percent of exact theoretical and experimental results. A sample input data set is presented for still another application of the program. Here, trapped electron orbits are traced in electric and magnetic fields in an ion gauge configuration. (ERA citation 04:050463)

SAND-79-0748C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Compton Scattering of Photons from Electrons in Magnetically Insulated Transmission Lines.
K. L. Brower, and J. P. VanDevender. 1979, 4p CONF-790622-3
Contract EY-76-C-04-0789
Pulsed power conference, Lubbock, TX, USA, 12 Jun 1979.

Self-magnetically insulated transmission lines are used for power transport between the vacuum insulator and the diode in high current particle accelerators. Since the efficiency of the power transport depends on the details of the initial line geometry, i.e., the injector, the dependence of the electron canonical momentum distribution on the injector geometry should reveal the loss mechanism. We propose to study that dependence experimentally

through a Compton scattering diagnostic. The spectrum of scattered light reveals the electron velocity distribution perpendicular to the direction of flow. The design of the diagnostic is in progress. Our preliminary analysis is based on the conservation of energy and canonical momentum for a single electron in the anti E and anti B fields determined from 2-D calculations. For the Mite accelerator with power flow along Z, the normalized canonical momentum, mu , is in the range - 0.7 < mu less than or equal to 0. For anti k/sub i/ parallel to circumflex Y, and anti k/sub s/ circumflex X, our analysis indicates that the scattered photons have 1.1 eV less than or equal to h nu/sub s/ < 5.6 eV for ruby laser scattering and can be detected with PM tubes. (ERA citation 04:050895)

20H. Particle Physics

AD-A074 310/4 PC **A06**/MF **A01**
Army Military Personnel Center Alexandria VA
The (11)B(p,n)(11)C Reaction: Measurements of Differential Cross Sections at Proton Energies between 3.1 and 4.5 MeV, and Applications to Depth Profiling.
Final rept.,
Richard Philip Ebright. 24 Aug 79, 109p
Master's thesis.

Thick target neutron time-of-flight techniques have been used to study the 11B(p,n)11C reaction at proton energies from threshold to 4.5 MeV. Neutron time-of-flight spectra were obtained at laboratory angles of 0, 20, 31, 50, 69.8, 80.3, 90, 100, 114, 138.2 and 155 degrees, and converted to cross sections averaged over 10 KeV intervals in proton energy. Targets of polycrystalline boron and B2O3 were used. Boron concentrations in Si and SiO2 targets of otherwise known composition were determined using the 11B(p,n)11C reaction with neutron time-of-flight techniques. The concentration was determined by taking the ratio of neutron time-of-flight spectra from a pure B metal target and a target of unknown boron content. This technique was applied to a Si wafer implanted in the < 100 > direction with 200 KeV atoms. (Author)

COO-2232A-70 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Production of pi exp +- , K exp +- , p, and Anti p by 400 GeV/C Protons.
W. F. Baker, A. S. Carroll, and I. H. Chiang. Oct 78, 9p FERMILAB-78/79-EXP
Contract EY-76-C-02-2232

Data are presented on the relative yields of pi exp +- , K exp +- , p and anti p with momenta between 60 and 370 GeV/c produced at forward angles by 400 GeV/c protons incident on a beryllium target. (ERA citation 04:050753)

JINR-R-4-10618 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Nuclear Reaction Duration under the Conditions of Strong Overlapping of the Resonance Levels.
V. L. Lyuboshits. 1977, 19p
In Russian.
U.S. Sales Only.

The problem is considered on the time delay of the wave packets at strong overlapping of the resonance levels. It is shown that in this case the collision duration exceeds essentially the lifetime of a separate level h/GITA, and its value is of the order of 2 pi h/nD, where n is the number of channels, D is the mean distance between the neighbouring levels. The probability distribution of the time delay at high level density is discussed, and the two-stage character of the elastic scattering process is pointed out. The results obtained indicate that under the strong overlapping of the resonance levels the effective cross section fluctuations are characterized by the correlation interval nD but not GITA, as it is accepted in the Ericson theory. (Atomindex citation 10:435595)

LA-UR-79-1423 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Bounds on the Weak Meson-Nucleon Couplings from Parity Violating Effects in Nonleptonic Nuclear Processes.
J. D. Bowman, B. F. Gibson, P. Herczeg, and E. M. Henley. 1979, 5p CONF-790648-4
Contract W-7405-ENG-36
Neutrino 1979 conference, Bergen, Norway, 18 Jun 1979.

The implications of the existing experimental and theoretical information on the p.v. meson-nucleon coupling constants are investigated. 9 references. (ERA citation 04:050721)

LA-7789-MS PC **A06**/MF **A01**
Los Alamos Scientific Lab., NM.
Calculation of Neutron Cross Sections on Isotopes of Yttrium and Zirconium.
E. D. Arthur. Apr 79, 118p
Contract W-7405-ENG-36

Multistep Hauser-Feshbach calculations with preequilibrium corrections were made for neutron-induced reactions on yttrium and zirconium isotopes between 0.001 and 20 MeV. Recently new neutron cross-section data have been measured for unstable isotopes of these elements. These data, along with results from charged-particle simulation of neutron reactions, provide unique opportunities under which to test nuclear-model techniques and parameters in this mass region. A complete and consistent analysis of varied neutron reaction types using input parameters determined independently from additional neutron and charged-particle data. The overall agreement between calculations and a wide variety of experimental results available for these nuclei leads to increased confidence in calculated cross sections made where data are incomplete or lacking. 75 references. (ERA citation 04:050770)

LBL-9234 PC **A02**/MF **A01**
California Univ., Berkeley.
First Results from the Berkeley--Fermilab--Princeton Multimuon Spectrometer.
M. Strovink. May 79, 23p
Contract W-7405-ENG-48

Muon interactions in a magnetized-steel calorimeter have produced 1000 +- 80 muons from J/psi(3100) decay, and 3 final states containing > 3 energetic muons. Use of proportional and drift chambers fully sensitive in the forward direction has resulted in uniform high acceptance for these processes, with 9% mass resolution. The psi photoproduction cross section continues to rise above 30 GeV, at a rate smaller than that predicted by a QCD calculation. Its Q exp 2 -dependence fits (1 + Q exp 2 /M exp 2) exp -2 with M = 2.7 +- 0.5 GeV. (ERA citation 04:050684)

ORNL/TM-6758 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Th(N,X gamma) Reaction Cross Section for Incident Neutron Energies Between 0.3 and 20.0 MeV.
G. L. Morgan. Aug 79, 61p
Contract W-7405-ENG-26

Differential cross sections for the neutron-induced gamma-ray production from thorium were measured for incident neutron energies between 0.3 and 20.0 MeV. The Oak Ridge Electron Linear Accelerator (ORELA) was used to provide the neutrons, and a NaI spectrometer, to detect the gamma rays at 125 exp 0 . The data presented are the double differential cross section, d exp 2 sigma/d omega dE, for gamma-ray energies between 0.3 and 10.6 MeV for coarse intervals in incident neutron energy. The integrated yield of gamma rays of energies greater than 300 keV with higher resolution in the neutron energy is also presented. 23 figures, 21 tables. (ERA citation 04:050789)

ORO-2504-292 PC **A02**/MF **A01**
Maryland Univ., College Park. Dept. of Physics.
Search for Axion Production in Low Energy Electron Bremsstrahlung.
D. J. Bechis, T. W. Dombeck, R. W. Ellsworth, E. V. Sager, and P. H. Steinberg. Mar 79, 13p
Contract EY-76-C-05-2504

Results of an experiment to detect axions produced by bremsstrahlung of 45 MeV electrons are presented. No signal is found. The upper limits are interpreted in terms of two models. 22 references. (ERA citation 04:050685)

20I. Plasma Physics

COO-2456-60 PC **A08**/MF **A01**
Columbia Univ., New York. School of Engineering and Applied Science.
Thermonuclear Burn in Wall-Confined Plasmas.
L. N. Kmetyk. 1979, 151p
Contract EY-76-S-02-2456

The one-dimensional initial value problem describing a hot, dense, thermonuclear reacting plasma which is magnetically insulated and contained between cold metal walls has been studied by means of computational simulation. The resulting time evolution of the plasma temperature, number density and magnetic field profiles includes the effects of thermal conduction and radiation energy losses from the plasma, convection, and a detailed treatment of alpha particle heating, as well as ohmic heating and magnetic field diffusion. The results are used to evaluate the net energy gains possible in a shock-heated, magnetically insulated, wall-confined fusion cycle. (ERA citation 04:050855)

N79-32098/2 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Single Particle Motion in a Toroidal Stellarator.
Y. Abe, K. Matsuoka, M. Sato, and K. Miyamoto. May 79, 25p IPPJ-397

A computer code which saves a great deal of computational time was developed to study particle behaviors in a toroidal stellarator in the drift approximation. With the use of this code, the motion of blocked and localized particles in an ordinary eta sub t eta sub n stellarator and transit banana and superbanana in an eta sub h eta sub t stellarator is studied and compared with theoretical expectations. Trapped particles in the additional mirror of a modular stellarator are also shown.

N79-32099/0 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Successive Bifurcations to Chaotic State in the Nonlinear Evolution of Collisional Drift Wave.
F. Kako, and M. Kono. Jun 79, 31p IPPJ-398

The successive bifurcations from a stationary state to a chaotic state in the nonlinear evolution of the collisional drift wave are studied using a set of model equations. A truncation scheme is introduced to eliminate numerical instabilities. A model system exhibits an inverted bifurcation for the stability of a fixed point to the case of the 12 mode system and a normal bifurcation in other cases. All cases, though different in the type of bifurcations of fixed points, undergo a sequence of bifurcations, exhibiting single periodic and doubly periodic and aperiodic motions successively. The properties of stochastic states are investigated.

N79-32100/6 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Spiky Soliton in Circular Polarized Alfven Wave.
Y. H. Ichikawa, K. Konno, M. Wadati, and H. Sanuki. Jun 79, 29p IPPJ-399

A new type of nonlinear evolution equation for the Alfven waves, propagating parallel to the magnetic field, is now registered to the completely integrable family of nonlinear evolution equations. Stationary solitary wave solutions for the plane wave boundary condition are presented. The obtained results exhibit peculiar structure of spiky modulation of amplitude and phase, which arises from the derivative nonlinear coupling term. A nonlinear equation for complex amplitude associated with the carrier wave is shown to be a mixed type of nonlinear Schroedinger equation, having an ordinary cubic nonlinear term and the derivative of cubic nonlinear term.

N79-32102/2 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Electromagnetic Drift Wave Turbulence and Convective Cell Formation.
H. Sanuki, and J. Weiland. Jun 79, 30p IPPJ-401

A model equation for nonlinear drift Alfven waves in the region where they do not couple to the electrostatic drift wave branch is derived. Two conservation relations are derived and the results are

compared to that of the Hasegawa-Mima equation. The spectrum is found to cascade to both smaller and larger k. The convective cell formation is studied for two different orderings of the parameters. The relation between characteristic scale lengths parallel and perpendicular to the drift flow for the onset of cell formation is found.

N79-32103/0 PC **A03**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Physics.
Deflagration Wave Formed by Ion Beam. Part 1: In Slab Target.
T. Abe, K. Kasuya, K. Niu, and M. Tamba. Jun 79, 31p IPPJ-402-PT-1

Structures of deflagration waves in slab targets under exposure to ion beams are analyzed for two cases of with and without heat tranfer. The structure of the deflagration wave depends on the two parameters, number density and velocity, of the ion beam. The heat conductivity effects on the wave strength are small but have a significant effect on the wave structure, especially for the cases of small beam velocities. The adiabatic compression of the target is studied by using the ion beam.

N79-32104/8 PC **A02**/MF **A01**
Nagoya Univ. (Japan). Inst. of Plasma Research.
Deflagration Wave Formed by Ion Beam. Part 2: In Spherical Target.
T. Abe, K. Kasuya, K. Niu, and M. Tamba. Jun 79, 17p IPPJ-403-PT-2

Analyses are given for structures of deflagration waves formed by ion beams in spherical targets. The singularity at the sonic point disappears in the spherical target if the beam pressure is in balance with the plasma pressure. The expanding supersonic flow of the background plasma can be connected with the subsonic flow in the core of the target through the defiagration wave. The length and the strength of the deflagration wave in the spherical target is comparable with the corresponding ones in the slab target.

PATENT-4 152 625 Not available NTIS
Department of the Army Washington DC
Plasma Generation and Confinement with Continuous Wave Lasers.
Patent,
Raymond W. Conrad. Filed 8 May 78, patented 1 May 79, 4p AD-D006 364/4, PAT-APPL-903 638 Supersedes PAT-APPL-903 638-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This patent discloses a method and apparatus for initiating a stable plasma and maintaining the plasma stationary. A high power, continuous wave laser is used to initiate and maintain the plasma, while a magnetic trap confines the plasma. (Author)

PPPL-1561 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Tearing Modes in a Plasma with Magnetic Braiding.
P. K. Kaw, E. J. Valeo, and P. H. Rutherford. Jul 79, 20p
Contract EY-76-C-02-3073

We examine certain linear and nonlinear properties of macroscopic tearing modes driven by anomalous electron viscosity effects associated with magnetic braiding. It is shown that strong linear growth of m = 1, 2 tearing modes (respectively proportional to mu /sup 1/5/ and mu /sup 1/3/) can occur for rather modest values of mu . In the nonlinear phase, the island width grows in time as t/sup 1/3/. Some speculations regarding the disruptive instability in Tokamaks are also investigated. (ERA citation 04:050868)

PPPL-1565 PC **A02**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Ion Acoustic Double Layers.
T. Sato, and H. Okuda. Jul 79, 16p
Contract EY-76-C-02-3073

It is found that, by means of numerical simulations, an ion acoustic instability (v/sub d/ < v/sub te/) results in the formation of double layers in a sufficiently long system. Anomalous resistivity generated by the ion acoustic instability causes the buildup of a dc potential which in turn accelerates electrons further to enhance the original instability leading to the formation of double layers. A necessary condition required for generating a double layer is given. (ERA citation 04:050869)

20J. Quantum Theory

AD-A074 372/4 Not available NTIS
Oregon Univ Eugene
Graphical Evaluation of Relativistic Matrix Elements,
Keh-Ning Huang. 1979, 21p ARO-15208.3-P
Contract DAAG29-78-G-0010
Prepared in cooperation with Nebraska Univ., Lincoln. Behlen Lab. of Physics.
Availability: Pub. in Reviews of Modern Physics, v51 n1 p214-238 Jan 79. (No copies furnished by DDC).

No abstract available.

N79-32122/0 PC **A03**/MF **A01**
California Inst. of Tech., Pasadena.
The Challenge of Detecting Gravitational Radiation Is Creating a New Chapter in Quantum Electronics: Quantum Nondemolition Measurements.
V. B. Braginsky, Y. I. Vorontsov, and K. S. Thorne. 1979, 40p NASA-CR-162272
Contracts NGR-05-002-25, NSF C-310

Future gravitational wave antennas will be approximately 100 kilogram cylinders, whose end-to-end vibrations must be measured so accurately (10 to the -19th power centimeters) that they behave quantum mechanically. Moreover, the vibration amplitude must be measured over and over again without perturbing it (quantum nondemolition measurement). This contrasts with quantum chemistry, quantum optics, or atomic, nuclear, and elementary particle physics where measurements are usually made on an ensemble of identical objects, and care is not given to whether any single object is perturbed or destroyed by the measurement. Electronic techniques required for quantum nondemolition measurements are described as well as the theory underlying them.

20K. Solid Mechanics

AD-A074 043/1 PC **A04**/MF **A01**
Control Data Corp Melville NY TRG Div
Excitation Efficiency of Surface Waves over Corrugated Metal and Doubly Corrugated Metal and in Dielectric Slabs on a Ground Plane,
Alan F. Kay. Dec 56, 53p TRG-SCIENTIFIC-5, AFCRC-TN-56-776
Contract AF19(604)-1307

Corrugated metal (and 'doubly corrugated metal') is an anisotropic boundary which supports only a hybrid surface wave mode in directions other than parallel or perpendicular to the corrugations. The mode phase velocity is a function of direction. To determine the excitation efficiency of these modes a three dimensional analysis is performed generalizing the results of Cullen and utilizing the author's previous work. The surface waves are shown to possess many of the properties of plane waves in a two dimensional anisotropic medium - notably that the energy propagation is radial and not generally normal to the wave fronts. Radial propagation, however, does not imply that the primary pattern of a feed and the resulting far pattern of the surface wave are the same. The hybrid plane wave component of the spectrum of the source which propagates in a direction psi parallel to the ground plane with the natural surface wave phase velocity of the boundary in this direction is observed in the far field in a direction phi not generally equal to psi. Moreover the excitation efficiency is not independent of psi. Therefore, the possibility of focussing by an anisotropic boundary remains

AD-A074 044/9 PC **A05**/MF **A01**
Army Missile Research and Development Command Redstone Arsenal AL Technology Lab
Modeling Friction in a Spring-Mass-Damper System.
Technical rept.,
David B. Merriman. 3 Jul 79, 87p Rept no. DRDMI-T-79-72

Using simple friction models in digital computer simulations sometimes leads to less than satisfactory results. Consequently two friction models were developed and tested in a second order system. (Author)

AD-A074 263/5 PC **A04**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Shock Propagation in the Three-Dimensional Lattice. II. Method of Calculation.
Technical rept.,
John D. Powell, and Jad H. Batteh. Jun 79, 61p ARBRL-TR-02175, AD-E430 290
See also Rept. no. ARBRL-TR-02174, AD-A074 347.

A computer-molecular-dynamic (CMD) technique for simulating shock propagation in a three-dimensional, face-centered-cubic lattice has been developed. The first report in this sequence described the model used and the results of the calculation. This report contains the details of the calculation, a listing of the computer code, definitions of major symbols, and a brief description of the subprograms.

AD-A074 269/2 PC **A05**/MF **A01**
David W Taylor Naval Ship Research and Development Center Bethesda MD
Analytical Solutions for Open Nonshallow Spherical Shell Vibrations.
Research and development rept.,
Gau-Feng Lin. Sep 79, 81p Rept no. DTNSRDC-79/075

This report is concerned with axisymmetric as well as nonsymmetric vibrations of open nonshallow thin elastic spherical shells. Without employing the usual auxiliary variables for reduction of shell motion equations introduced by Van der Neut and Berry, independent analytical solutions for middle-surface displacements are obtained and explicitly expressed in terms of associated Legendre functions. In order to gain physical insights into the free-vibration characteristics of an open nonshallow shell, theoretical calculations together with asymptotic descriptions are made of natural frequencies and mode shapes of a hemispherical shell with a free edge. Five families of natural frequencies, i.e., low Rayleigh bending, mixed bending-membrane, torsional, bending and membrane frequencies, are found. The corresponding mode shapes exhibit distinctive displacement patterns.

AD-A074 320/3 Not available NTIS
Naval Research Lab Washington DC Shock and Vibration Information Center
The Shock and Vibration Digest. Volume 11. Number 9,
Judith Nagle-Eshleman. Sep 79, 114p
See also Volume 11, Number 8, AD-A073 239.
Availability: Naval Research Lab., Attn: Code 8404, Washington, DC 20375. Annual Rate $100.00. (No copies furnished by DDC).

Partial Contents: A History of Shock Testing of Ships with Underwater Explosions; Literature Review--Techniques and Applications of Mechanical signature analysis; Damping in structural joints; and Abstracts from the Current Literature.

AD-A074 347/6 PC **A03**/MF **A01**
Army Armament Research and Development Command Aberdeen Proving Ground MD Ballistics Research Lab
Shock Propagation in the Three-Dimensional Lattice. I. Model and Results.
Technical rept.,
John D. Powell, and Jad H. Batteh. Jun 79, 45p ARBRL-TR-02174, AD-E430 295
See also Rept. no. ARBRL-TR-02175, AD-A074 263.

Shock propagation in a three-dimensional, monatomic, face-centered-cubic (FCC) lattice is studied using a computer-molecular-dynamic (CMD) technique. It is demonstrated that compression of the lattice gives rise to a spectrum of well-defined, longitudinal pulses (solitary waves) which propagate in the vicinity of the shock front amid the thermal

background of the lattice. The properties of these pulses are examined in some detail and it is demonstrated that they are not completely stable. Rather, they tend to decay as they propagate into the lattice, producing both random, thermal motion and, in some cases, transverse solitary-wave motion. The effects of the solitary waves upon the temperature, density, and stress profiles and upon the approach to thermal equilibrium behind the shock front are investigated.

LA-UR-79-1320 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
INGEN: A General-Purpose Mesh Generator for Finite Element Codes.
W. A. Cook. May 79, 23p CONF-790811-2
Contract W-7405-ENG-36
International seminar on computational aspects of the finite element method, Berlin, F.R. Germany, 20 Aug 1979.

INGEN is a general-purpose mesh generator for two- and three-dimensional finite element codes. The basic parts of the code are surface and three-dimensional region generators that use linear-blending interpolation formulas. These generators are based on an i, j, k index scheme that is used to number nodal points, construct elements, and develop displacement and traction boundary conditions. This code can generate truss elements (2 modal points); plane stress, plane strain, and axisymmetry two-dimensional continuum elements (4 to 8 nodal points); plate elements (4 to 8 nodal points); and three-dimensional continuum elements 8 to 21 nodal points). The traction loads generated are consistent with the element generated. The expansion--contraction option is of special interest. This option makes it possible to change an existing mesh such that some regions are refined and others are made coarser than the original mesh. 9 figures. (ERA citation 04:050917)

N79-31620/4 PC **A16**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
ATLAS, an Integrated Structural Analysis and Design System. Volume 1: ATLAS User's Guide.
R. L. Dreisbach. Jul 79, 357p NASA-CR-159041, D6-25400-0001-V-1
Contract NAS1-12911

Some of the many analytical capabilities provided by the ATLAS Version 4.0 system in the logical sequence are described in which model-definition data are prepared and the subsequent computer job is executed. The example data presented and the fundamental technical considerations that are highlighted can be used as quides during the problem soloving process. This guide does not describe the details of the ATLAS capabilities, but provides an introduction to the new user of ATLAS to the level at which the complete array of capabilities described in the ATLAS User's Manual can be exploited fully.

N79-31621/2 PC **A20**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
ATLAS, an Integrated Structural Analysis and Design System. Volume 2: System Design Document.
W. J. Erickson. Jul 79, 464p NASA-CR-159042, D6-25400-0002-V-2
Contracts NAS1-12911, DAAG46-75-C-0072

ATLAS is a structural analysis and design system, operational on the Control Data Corporation 6600/CYBER computers. The overall system design, the design of the individual program modules, and the routines in the ATLAS system library are described. The overall design is discussed in terms of system architecture, executive function, data base structure, user program interfaces and operational procedures. The program module sections include detailed code description, common block usage and random access file usage. The description of the ATLAS program library includes all information needed to use these general purpose routines.

N79-31622/0 PC **A99**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
ATLAS, an Integrated Structural Analysis and Design System. Volume 3: User's Manual, Input and Execution Data.
R. L. Dreisbach. Jul 79, 698p NASA-CR-159043, D6-25400-0003-V-3
Contracts NAS1-12911, DAAG46-75-C-0072

The input data and execution control statements for the ATLAS integrated structural analysis and design system are described. It is operational on the Control Data Corporation (CDC) 6600/CYBER computers in a batch mode or in a time-shared mode via interactive graphic or text terminals. ATLAS is a moduiar system of computer codes with common executive and data base management components. The system provides an extensive set of general-purpose technical programs with analytical capabilities including stiffness, stress, loads, mass, substructuring, strength design, unsteady aerodynamics, vibration, and flutter analyses. The sequence and mode of execution of selected program modules are controlled via a common user-oriented language.

N79-31623/8 PC **A24**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
ATLAS, an Integrated Structural Analysis and Design System. Volume 4: Random Access File Catalog.
F. P. Gray, Jr.. Jul 79, 559p NASA-CR-159044, D6-25400-0004-V-4
Contracts NAS1-12911, DAAG46-75-C-0072

A complete catalog is presented for the random access files used by the ATLAS integrated structural analysis and design system. ATLAS consists of several technical computation modules which output data matrices to corresponding random access file. A description of the matrices written on these files is contained herein.

N79-31624/6 PC **A12**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
ATLAS, an Integrated Structural Analysis and Design System. Volume 5: System Demonstration Problems.
R. A. Samuel. Jul 79, 271p NASA-CR-159405, D6-25400-0005-V-5
Contracts NAS1-12911, DAAG46-75-C-0072

One of a series of documents describing the ATLAS system for structural analysis and design is presented. A set of problems is described that demonstrate the various analysis and design capabilities of the ATLAS System proper as well as capabilities available by means of interfaces with other computer programs. Input data and results for each demonstration problem are discussed. Results are compared to theoretical solutions or experimental data where possible. Listings of all input data are included.

N79-31625/3 PC **A05**/MF **A01**
Boeing Commercial Airplane Co., Seattle, WA.
ATLAS, an Integrated Structural Analysis and Design System. Volume 6: Design Module Theory.
B. F. Backman. Jul 79, 79p NASA-CR-159406, D6-25400-0006-V-6
Contracts NAS1-12911, DAAG46-75-C-0072

The automated design theory underlying the operation of the ATLAS design module is decribed. The methods, applications and limitations associated with the fully stressed design, the thermal fully stressed design and a regional optimization algorithm are presented. A discussion of the convergence characteristics of the fully stressed design is also included. Derivations and concepts specific to the ATLAS design theory are shown, while conventional terminology and established methods are identified by references.

20L. Solid-State Physics

AD-A073 863/3 PC **A02**/MF **A01**
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
Intrinsic-Defect Photoluminescence in Amorphous SiO2,
C. M. Gee, and Marc Kastner. 5 Mar 79, 6p
Contract DAAG29-78-C-0020
Pub. in Physical Review Letters, v42 n26 p1765-1769, 25 Jun 79.

No abstract available.

AD-A073 868/2 PC **A02**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
100 W Average Power 10.6 micrometers Isolator Based on the Interband Faraday Effect in InSb.
Journal article,
Louis R. Tomasetta, Donald H. Bates, and William E. Bicknell. 2 Aug 78, 5p JA-4834, ESD-TR-79-171
Contract F19628-78-C-0002, ARPA Order-600
Pub. in IEEE Jnl. of Quantum Electronics, vQE-15 n5 p266-269 May 79.

No abstract available.

AD-A073 883/1 PC **A02**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Higher-Order Nonlinear Processes in CdGeAs2.
Journal article,
Helge Kildal, and Gerald W. Iseler. 25 Oct 78, 6p JA-4906, ESD-TR-79-175
Contract F19628-78-C-0002
Pub. in Physical Review B, v19 n10 p5218-5222, 15 May 79.

No abstract available.

AD-A073 920/1 PC **A09**/MF **A01**
North Texas State Univ Denton Dept of Physics
Optically Induced Hot Electron Effects in Semiconductors.
Summary rept. 1 Sep 78-31 Aug 79,
Arthur L. Smirl. 1 Jun 78, 194p
Contract N00014-76-C-1077

We report our progress in using the high electric fields and ultrashort pulses from mode-locked lasers to study the temporal evolution of the saturable optical properties of semiconductors on a picosecond time scale. In these studies, the excite and probe technique is employed to obtain information concerning the ultrafast dynamics of photogenerated electron-hole plasmas. Germanium has been chosen for the initial investigations since its bandgap energy is comparable to but less than the photon energy of the Nd: glass laser.

AD-A073 935/9 Not available NTIS
Northwestern Univ Evanston IL
The Polynomial Eigenstrain Problem for an Anisotropic Ellipsoidal Inclusion,
T. Mura, and N. Kinoshita. 20 Mar 78, 4p ARO-14127.6-E
Grant DAAG29-77-G-0042
Availability: Pub. in Physica Status Solidi (A) Applied Research, v48 n2 p447-450 1978. (No copies furnished by DDC).

No abstract available.

AD-A073 936/7 Not available NTIS
Northwestern Univ Evanston IL Dept of Civil Engineering
The Elastic Field Around an Elliptical Crack in an Anisotropic Medium under an Applied Stress of Polynomial Forms,
H. Sekine, and T. Mura. 21 Feb 78, 9p ARO-14127.7-E
Grant DAAG29-77-G-0042
Availability: Pub. in International Jnl. of Engineering Science, v17 n5-J p641-649 1979. (No copies furnished by DDC).

No abstract available.

AD-A073 938/3 Not available NTIS
Minnesota Univ Minneapolis Dept of Electrical Engineering
Generation-Recombination Noise at 77 K in Silicon Bars and JFETs,
A. van der Ziel, R. Jindal, S. K. Kim, H. Park, and J. P. Nougier. 13 Mar 78, 4p ARO-14273.8-EL
Grant DAAG29-77-G-0106
Availability: Pub. in Solid-State Electronics, v22 n2-D p177-179 1979. (No copies furnished by DDC).

No abstract available.

AD-A073 939/1 Not available NTIS
Pennsylvania Univ Philadelphia Dept of Physics
Resonance Inelastic Light Scattering by Charge Carriers at Semiconductor Surfaces,
E. Burstein, A. Pinczuk, and S. Buchner. 1979, 4p ARO-14332.1-P
Grant DAAG29-76-G-0325

Availability: Pub. in Proceedings of Institute of Physics Conference Ser., n43 ch32 p1231-1234 1979. (No copies furnished by DDC).

No abstract available.

AD-A073 946/6 Not available NTIS
Oklahoma State Univ Stillwater Dept of Physics
Energy Transfer and Radiationless Relaxation in Nd-Doped Mixed Crystals,
R. C. Powell, J. M. Flaherty, and M. Zokai. 1979, 4p ARO-13318.9-P
Contract DAAG29-76-G-0099
Availability: Pub. in Jnl. of Luminescence, v18/19 p785-788 1979. (No copies furnished by DDC).

No abstract available.

AD-A073 986/2 Not available NTIS
California Univ Los Angeles Dept of Physics
Cooperative Phenomena of Random Electric Dipoles in an Amorphous Matrix,
R. Braunstein, and K. Baerner. 13 Jun 78, 5p ARO-14249.4-P
Grant DAAG29-76-G-0321
Availability: Pub. in Solid State Communications, v28 n10 p847-851 1978. (No copies furnished by DDC).

No abstract available.

AD-A073 987/0 Not available NTIS
California Univ Los Angeles Dept of Physics
Dipole Correlations in TeO2-WO3 Glass,
R. Braunstein, I. Lefkowitz, and J. Snare. 13 Jun 78, 3p ARO-14249.2-P
Grant DAAG29-76-G-0321
Prepared in cooperation with North Carolina Univ. at Chapel Hill. Dept. of Physics.
Availability: Pub. in Solid State Communications, v28 n10 p843-845 1978 (No copies furnished by DDC).

No abstract available.

AD-A073 998/7 PC **A03**/MF **A01**
Brown Univ Providence RI Dept of Chemistry
Electrical and Optical Properties of High Purity p-Type Single Crystals of GeFe2O4.
Technical rept.,
Pierre Strobel, Frank P. Koffyberg, and Aaron Wold. Sep 79, 26p Rept no. TR-7
Contract N00014-77-C-0387, Grant NSF-GF-39737

Single crystals of the spinel GeFe2O4, grown by the chemical vapor transport technique, are p-type semiconductors with an acceptor ionization energy of 0.39 eV. The material is a heavily compensated band-type semiconductor, with a typical hole concentration of 3/10 to the 14 power cm near room temperature, and a temperature independent Hall mobility of 2 sq cm/Vs. Optical absorption measurements show the optical band gap to be 2.3 eV; the octahedral field splitting of the Fe(2+) d-levels is 10200 1/10200 cm. Magnetic measurements show that n(eff) is 5.26, from which a trigonal field splitting of 1/950 cm is derived. (Author)

AD-A074 006/8 Not available NTIS
Rensselaer Polytechnic Inst Troy NY Dept of Mechanical Engineering Aeronautical Engineering and Mechanics
First Temperature Derivatives of the Fundamental Elastic Constants of Quartz,
B. K. Sinha, and H. F. Tiersten. 19 Jun 78, 9p ARO-13783.4-ELX
Contract N00014-76-C-0368, Grant DAAG29-76-G-0173
Sponsored in part by Grant NSF-ENG72-04223.
Availability: Pub. in Jnl. of Applied Physics, v50 n4 p2732-2739 Apr 79 (No copies furnished by DDC).

No abstract available.

AD-A074 011/8 Not available NTIS
Advanced Research and Applications Corp Sunnyvale CA
Si Epitaxial Regrowth and Grain Structure of Al Metallization on Si of Plane(100),
T. J. Magee, and J. Peng. 2 Dec 77, 3p ARO-14931.1-MS
Contract DAAG29-77-C-0024
Availability: Pub. in Jnl. of Applied Physics, v49 n7 p4284-4286 Jul 78 (No copies furnished by DDC).

No abstract available.

AD-A074 033/2 PC **A02**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Electroabsorption in GaInAsP.
Journal articles,
Robert H. Kingston. 26 Feb 79, 4p JA-4937, ESD-TR-79-176
Contract F19628-78-C-0002
Pub. in Applied Physics Letters, v34 n11 p744-746, 1 Jun 79.

No abstract available.

AD-A074 178/5 PC **A03**/MF **A01**
Michigan Univ Ann Arbor Electron Physics Lab
Electrical Compensation in InP Produced by Background Impurities and Structural Defects.
Final rept.,
B. L. Mattes. Aug 79, 32p
Contract N00019-78-C-0406

Liquid phase epitaxial layers of InP have been grown at 475 degrees C by a steady-state growth technique that maintains the substrate at a constant temperature. The growth system has excellent temperature control, fast thermal response, uniform temperature profiles and up to 50 degrees of C/cm temperature gradients can be induced normal to the substrate. To achieve uniform nucleation on InP substrates at these low temperatures a submersed-displacement cleaning procedure was developed that uses a dilute HCl-methanol etch to remove oxides. The initial layers were discontinuous and had poor electrical properties due to oxide contamination in the In-melt and to substrate oxidation during the heat-up cycle. New in and the covering of the substrate with InP during heat-up appears to have solved this problem. Thermodynamic models of the growth system indicate that the graphite growth cell increases the decomposition of fused quartz and introduces C, O and Si into the In-melt. (Author)

AD-A074 222/1 PC **A02**/MF **A01**
Georgia Inst of Tech Atlanta School of Physics
Theoretical Investigation of the Excitation Structure and Optical Properties of Titanium, Vanadium, and Their Oxides.
Annual rept. 1 Oct 76-30 Sep 77,
Martin W. Ribarsky. 8 Jul 79, 13p AFOSR-TR-79-0971
Grant AFOSR-76-3108

An investigation of the electronic excitation structure of the transition metal oxides was begun which included the effects of correlation of the excited electron with the surrounding medium, relaxation of the electrons around the hole left by the excitation, and the interaction of the excited electron with the hole. Recent theoretical and experimental work has shown that all these effects must be included in order to obtain a detailed understanding of the excitation structure, optical properties, lattice dynamics, and dielectric response of these oxides and many other materials. Local orbitals instead of the usual spatially extended Bloch representation were used. The local orbitals are especially useful in describing the d-electrons, which are localized in position and energy. The extensive codes necessary for the efficient calculation of multicenter integrals were constructed and assembled during the past year. The methods necessary for transforming the band states from the Bloch to the local orbitals representation were developed, and the methods for diagonalizing very large array were investigated. (Author)

AD-A074 283/3 Not available NTIS
Northwestern Univ Evanston IL Dept of Civil Engineering
Recent Results in Micromechanics,
T. Mura. 1977, 11p ARO-14127.5-E
Grant DAAG29-77-G-0042
Presented at IUTAM Symposium, 24-27 Aug 77, Tokyo (Japan).
Availability: Pub. in High Velocity Deformation of Solids, p295-304 1977. (No copies furnished by DDC).

No abstract available.

AD-A074 305/4 Not available NTIS
Northwestern Univ Evanston IL Dept of Civil Engineering
Weakening of an Elastic Solid by a Periodic Array of Penny-Shaped Cracks,
H. Sekine, and T. Mura. 5 Sep 78, 10p ARO-14127.12-E
Grant DAAG29-77-G-0042
Availability: Pub. in International Jnl. of Solids Structures, v15 p493-502 1979. (No copies furnished by DDC).

No abstract available.

AD-A074 375/7 PC **A03**/MF **A01**
Technion - Israel Inst of Tech Haifa Material Mechanics Lab
Dynamic Response of a Slab of Elastic-Viscoplastic Material that Exhibits Induced Plastic Anisotropy,
J. Aboudi, and S. R. Bodner. Aug 79, 41p MML-67, SCIENTIFIC-1, AFOSR-TR-79-0964
Contract F49620-79-C-0196

Various two-dimensional problems of the dynamic loading of a slab are solved for a material characterization that is elastic-viscoplastic and exhibits anisotropic work-hardening. The governing constitutive equations are based on a unified formulation which requires neither a yield criterion nor loading or unloading conditions. They include multi-dimensional anisotropic effects induced by the plastic deformation history. The theory also considers plastic compressibility which depends on the extent of anisotropy. A numerical procedure for solving equations is developed which incorporates the history dependent anisotropic hardening effects. Cases considered are the dynamic penetration of a slab by a rigid cylindrical indenter, and a distributed force rapidly applied over part of the slab surface. Both conditions of fixed and free rear surfaces of the slab are examined. A uniaxial problem is also considered in which different bases for the anisotropic hardening law are examined. (Author)

IS-M-202 PC **A03**/MF **A01**
Ames Lab., IA.
Photothermal Conversion Surface Measurements Using Photoacoustic and Photothermal Spectroscopies.
J. F. McClelland, and R. N. Kniseley. 1978, 31p CONF-780550-10
Contract W-7405-ENG-82
Seminar on testing solar energy materials and systems, Washington, DC, USA, 22 May 1978.

Photoacoustic and photothermal spectroscopic techniques have recently been under development in a number of laboratories. When applied to solar materials studies these techniques have the potential of providing a more direct measurement of photothermal conversion efficiency than conventional reflection or transmission measurements. Measurements are made by modulating the intensity of an incident light beam which causes a temperature oscillation in the irradiated material under study with the oscillation amplitude proportional to the absorbed and subsequently thermalized light energy. In the photoacoustic method the oscillation amplitude is measured by a transducer which detects an acoustical signal driven by the temperature oscillation. A thermal transducer is used as the detector in the photothermal technique. Spectral or integrated measurements are made using a monochromatic or broadband source with no correction needed for the spectral dependence of a detector since the signal is generated by the interaction of light with the sample rather than with a detector. This allows spectrally integrated surface absorptivities to be measured directly, without integration of data, using a solar simulator, natural sunlight, or a blackbody source, with the latter operated at a temperature of interest for IR emissivity studies. Calibration methods currently being developed include standard surfaces and Joule heating based on electrical standards. Experimental setups are described. (ERA citation 04:049771)

NUREG/CR-1085 PC **A10**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Analysis of Shear Transfer in Reinforced Concrete with Application to Containment Wall Specimens.
Technical rept.,
Peter Leombruni, Oral Buyukozturk, and Jerome Connor. Sep 79, 218p

In this report the shear transfer mechanism across continuous cracks penetrating through the thick-

ness of a reinforced concrete element are investigated. The parameters influencing shear stiffness of the cracked sections are identified. Based on these parameters a mathematical model is developed for the prediction of the shear stiffness. This model is used to evaluate the shear rigidity of orthogonally reinforced concrete panels exhibiting parallel or orthogonal through cracks. The model is applicable to biaxially tensioned wall specimens subjected to monotonically increasing tangential shear stress. For two test specimens, the shear rigidity as predicted by the proposed model is implemented in a finite element computer program. Three dimensional finite element analysis is performed for these specimens to study the behavior of a containment wall portion under biaxial tension and tangential shear loading. The influence of the crack patterns and their stiffness on shear deformation and reinforcement stresses in the specimen is evaluated. The proposed model and analysis procedure predict shear rigidities and structural responses consistent with the observed behavior of the test specimens.

PB80-101934 PC **A10**/MF **A01**
Department of Energy, Washington, DC.
Ukrainian Physics Journal,
V. E. Lashkarev. c1979, 202p TT-74-52000/03
Trans. of Ukrainskii Fizicheskii Zhurnal (USSR) v17 n3 Mar 72, by Y. V. Kathavate. See also Volume 16, Number 12, AEC-TR-7297-12. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

A cover-to-cover translation is provided for Vol. 17, No.3, March 1972, of Ukrainskii Fizicheskii Zhurnal. Papers on solid state physics, elementary particle physics, plasma physics, and nuclear physics are included.

SAND-79-0684C PC **A04**/MF **A01**
Sandia Labs., Albuquerque, NM.
Ion-Beam-Induced Migration and Its Effect on Concentration Profiles.
S. M. Myers. 1979, 70p CONF-790671-2
Contract EY-76-C-04-0789
International conference on ion beam analysis, Aarhus, Denmark, 25 Jun 1979.

The mechanisms by which ion irradiation influences atomic transport are reviewed, including cascade mixing, enhanced diffusion via mobile point defects, rapid diffusion along extended defects, and solute trapping at irradiation damage. The effects of these processes on measured concentration profiles are considered for high-energy ion beam analysis. (ERA citation 04:049351)

SAND-79-1511C PC **A03**/MF **A01**
Sandia Labs., Albuquerque, NM.
High Pressure Studies of Ionic Conductivity in Solids.
G. A. Samara. 1979, 26p CONF-790709-6
Contract EY-76-C-04-0789
VII international AIRAPT conference, La Creusot, France, 30 Jul 1979.

The pressure dependence of the ionic conductivity provides information about the volume relaxation associated with the formation of lattice defects as well as with the diffusive motion of these defects, and thereby helps elucidate the conduction process. Pressure results on a variety of crystals will be discussed with emphasis on recent results on crystals with large lattice polarizabilities and soft phonon modes. Pressure is shown to be an important--sometimes essential, variable in the study of ionic transport processes. (ERA citation 04:050808)

UCRL-82598 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Photoacoustic Spectrosccpy of Condensed Matter: A Review.
A. Rosencwaig. 13 Apr 79, 6p CONF-790819-3
Contract W-7405-ENG-48
Topical meeting on photoacoustic spectroscopy, Ames, IA, USA, 1 Aug 1979.

Some of the major highlights in the development of photoacoustic spectroscopy since 1973 are presented, and new trends in the field are outlined. (ERA citation 04:050811)

20M. Thermodynamics

NUREG/CR-1054 PC **A05**/MF **A01**
Argonne National Lab., IL.
Transition Boiling Heat Transfer in Forced Vertical Flow.
Final rept. Jun 78-Jun 79,
S. C. Cheng, H. Ragheb, W. W. L. Ng, K. T. Heng, and S. Roy. Nov 79, 87p ANL-79/78
Prepared by Ottawa Univ. (Ontario). Dept. of Mechanical Engineering. See also NUREG/CR-0357.

This is the third year of a study using high thermal capacity and inertia test sections to construct boiling curves for distilled water at atmospheric conditions. To investigate the effect of heated surface thermal properties, boiling curves were generated from various composite test sections using a one-dimensional three-layer model. A general empirical correlation including the effect of thermal properties as well as mass flux and inlet subcooling has been proposed. The earlier two-dimensional model, considering axial conduction, was modified and an application in Inconel-copper composite test section semonstrated. An investigation for the surface wetted area during transtion boiling based on the electric probe study was conducted. The purpose of this study is to investigate phenomena occurring in water cooled reactors during loss of coolant accidents.

N79-31581/8 PC **A06**/MF **A01**
Societe Anonyme Belge de Constructions Aeronautiques, Brussels (Belgium).
Design and Development of a High Performance Variable Conductance Heat Pipe, Phase 2.
Final Report.
J. P. Mathieu, and B. Moschetti. Dec 78, 109p H05/N1/79, ESA-CR(P)-1194
Contract ESTEC-3007/76-NL-PP(SC)
Subm-Prepared in Cooperation with Snias, Cannes, France.

Variable conductance heat pipes (VCHP) and constant conductance heat pipes (CCHP) were designed as 100 watt/meter capillary systems. Design constraints included a 10 mm diameter and a temperature control passive system based on the cold reservoir technique. The manufacturing of two engineering prototypes, their heat transport and temperature control testing, and their submission to a defined test environment is reported on. The 100 watt/meter objective was attained both as CCHP and as VCHP, either in a straight or a curved configuration. Temperature control was also satisfactory, but the volume ratio required modification in light of experimentally determined parameters in order to meet the performance specification. Finally, both heat pipes survived the space environment tests as regards their heat transport performance and temperature control characteristics.

N79-31582/6 PC **A20**/MF **A01**
Aeritalia S.p.A., Torino (Italy).
Survey of Space Radiator Systems.
Final Report.
L. Bussolino. Nov 78, 470p TASS-78-B-1814, ESA-CR(P)-1217
Contract ESTEC-3378/77-NL-PP(SC)

A survey of the state of the art of radiator systems was conducted and the design of various radiator concepts was analyzed, including the related interfaces. The treated subjects include location analysis, heat rejection and efficiency, thermal hydraulic and mechanical interfaces, analysis and design of fluid loops, heat pipe radiators, and hybrid concepts. A general comparison of the above cited concepts and an outline of problem areas to be developed is presented.

N79-32028/9 PC **A18**/MF **A01**
SEMA (Metra International), Paris (France).
Development of a Computer System for the Calculation and Management of Thermal Mathematical Models: Step 2.
Final Report.
A. Gruyer, and J. M. Leglas. Aug 78, 417p ESA-CR(P)-1186
Contract ESTEC-3438/77-NL-PP(SC)

Concerning view factors computation, previous work was continued in order to define algorithms ensuring sufficient precision in any case. New preshade methods were developed so that the system would save a lot of central processing unit time when modifying of combining models. Much work was done on the management aspects; items and concepts are precisely defined and a first description of the specifications of the treatments is presented.

20N. Wave Propagation

AD-A074 252/8 Not available NTIS
California Univ Berkeley Dept of Electrical Engineering and Computer Sciences
Finite-Element Computation of Scattering by Inhomogeneous Penetrable Bodies of Revolution,
Michael A. Morgan, and Kenneth K. Mei. 22 Mar 78, 13p ARO-14270.3-EL
Grant DAAG29-77-G-0021
Availability: Pub. in IEEE Transactions on Antennas and Propagation, vAP-27 n2 p202-214 Mar 79 (No copies furnished by DDC).

No abstract available.

AD-A074 300/5 Not available NTIS
California Univ Berkeley Dept of Electrical Engineering and Computer Sciences
Finite Methods in Electronmagnetic Scattering,
Kenneth K. Mei, Michael E. Morgan, and Shu-Kong Chang. 1978, 34p ARO-14270.1-EL
Contract DAAK02-75-C-0002, Grant DAAG29-77-G-0021
Availability: Pub. in Electromagnetic Scattering, p359-392 1978 (No copies furnished by DDC).

No abstract available.

21. PROPULSION AND FUELS

21B. Combustion and Ignition

AD-A073 984/7 Not available NTIS
Purdue Univ Lafayette IN Combustion Lab
Characteristic Time Correlation for Lean Blowoff of Bluff-Body-Stabilized Flames,
S. L. Plee, and A. M. Mellor. 18 Jul 78, 20p ARO-15642.2-E
Grant DAAG29-78-G-0092
Availability: Pub. in Combustion and Flame, v35 p61-80 1979. (No copies furnished by DDC).

No abstract available.

ANL/CEN/FE-79-3 PC **A04**/MF **A01**
Argonne National Lab., IL.
Support Studies in Fluidized-Bed Combustion. Quarterly Report, October--December 1978.
I. Johnson, W. M. Swift, S. H. D. Lee, J. A. Shearer, and F. G. Teats. May 79, 53p
Contract W-31-109-ENG-38

These studies support the development program in atmospheric and pressurized fluidized-bed coal combustion. Laboratory and process development-scale studies are aimed at providing information on limestone utilization, control of the emission of alkali metal compounds and SO sub 2 during combustion, particulate loading in flue gas, and other aspects of fluidized-bed coal combustion. This report presents information on the effect of bed temperature, superficial gas velocity and gas hourly space velocity on the removal of gaseous NaCl from hot gas streams by a granular bed of diatomaceous earth; results of experiments in which the adsorption capacity for gaseous NaCl of activated bauxite was measured after regeneration by an aqueous leaching process; and an estimate of the cost of using these two sorbents for alkali metal control in a large PFBC. Results are also presented for studies aimed at the development of an acoustic dust conditioning system, and the evaluation of a high-efficiency cylone for removal of particles from a high-pressure, high-temperature gas stream. The relationship of the SO sub 2 reactivity of limestones to internal surface area, pore diameter, and pore volume are examined. (ERA citation 04:048091)

COO-4740-4 PC **A02**/MF **A01**
Management and Technical Services Co., Clairton, PA.

Operation, Modification, and Maintenance of DOE/PETC 700 H.P. Combustion Test Facility. Quarterly Activity Report, January 1, 1979--April 1, 1979.
1979, 7p
Contract EW-78-C-02-4740

Number six fuel oil tests, 30% COM tests, and 40% COM tests were conducted. Operation, modification, and maintenance of the combustion test facility is described. (ERA citation 04:048092)

COO-4740-5 PC **A02**/MF **A01**
Management and Technical Services Co., Clairton, PA.
Operation, Modification, and Maintenance of DOE/PETC 700 H.P. Combustion Test Facility. Yearly Activity Report, April 3, 1978--April 1, 1979.
1978, 20p
Contract EW-78-C-02-4740

The operation, modifications and maintenance of the DOE/PETC 700 H.P. combustion test facility are described. Shakedown and operation limit tests were performed with No. 6 fuel oil and 30% COM. The tests involved flame studies, erosion, corrosion and the examination of boiler deposits. Various construction, modification and maintenance efforts are detailed. The original 100 H.P. test facility was scrapped after 3 months operation under this contract and construction of a new 100-20 H.P. test facility begun. (ERA citation 04:048093)

FE-2744-T1 PC **A03**/MF **A01**
University of South Florida, Tampa. Coll. of Engineering.
Combustion of Methanol Coal Slurries in the Hartmann Resonator. Final Report, August 15, 1977--March 15, 1979.
S. C. Kranc. Mar 79, 31p
Contract EF-77-G-01-2744

A series of experiments were conducted to determine the combustion characteristics of mixtures of finely pulverized coal suspended in methanol. Such mixtures could be attractive alternate fuels since the advantages of methanol combustion are retained while raising the heating value on a mass basis. A second major aspect of this study was concerned with the development and application of the Hartmann atomizer to deliver the fuel. This is an air atomizer which produces intense gas pulsations that help to disrupt and disperse the fuel. Fuel mixtures using several coal types were tested. The fuels were burned in the wake of a disk baffle incorporating the atomizer and located in a water jacketed flame tube. Measurements of heat deposited in the water jacket and exhaust gas were made. Analysis of the data indicates that the coal suspensions compare favorably to pure methanol under test conditions. (ERA citation 04:048095)

N79-31358/1 PC **A08**/MF **A01**
General Electric Co., Cincinnati, OH.
Lean, Premixed-Prevaporized (LPP) Combustor Conceptual Design Study.
Final Report.
R. A. Dickman, W. J. Dodds, and E. E. Ekstedt. May 79, 152p NASA-CR-159629, R79AEG376
Contract NAS3-21255

Four combustion systems were designed and sized for the energy efficient engine. A fifth combustor was design for the cycle and envelope of the twin-spool, high bypass ratio, high pressure ratio turbofan engine. Emission levels, combustion performance, life, and reliability assessments were made for these five combustion systems. Results of these design studies indicate that cruise NOx emission can be reduced by the use of lean, premixed-prevaporaized combustion and airflow modulation.

ORNL/TM-6633 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Assessment of the State of the Art of Pressurized Fluidized Bed Combustion Systems.
A. P. Fraas, R. L. Graves, and M. E. Lackey. 16 May 79, 56p
Contract W-7405-ENG-26

This report was prepared at the request of the Tennessee Valley Authority (TVA) to clarify the development status of the pressurized fluidized bed combustor (PFBC) and to place in perspective the problems which are yet to be solved before commercialization of the concept is practical. The report is viewed as preliminary to a more complete and comprehensive work to be carried out during FY 1979. An evaluation of the PFBC concept cites potential advantages over atmospheric pressure fluidized bed combustors (AFBC) in the areas of combustion efficiency, sulfur retention, furnace design, power plant efficiency, and others. The key disadvantage of unproven hot gas cleanup and associated gas turbine technology is discussed in considerable detail. A survey of existing and developing PFBC experimental facilities is presented plus some results from the experimental programs. Recent design studies for full-sized PFBC power plants are reviewed with emphasis on key design parameters. Results for similar AFBC design studies are presented in contrast. The general conclusion drawn from this preliminary survey is that the potential advantages of the PRBC used in conjunction with a high-temperature (850 exp 0 C (1560 exp 0 F)) gas turbine will be difficult to realize due primarily to the formidable task of developing adequate hot gas cleanup and turbine systems, and due to the anticipated high cost of these systems. (ERA citation 04:050461)

SAN-1900-T1 PC **A04**/MF **A01**
General Electric Co., Schenectady, NY.
Turbulent Combustion Experiments and Modeling. Technical Progress Report, August 1--December 31, 1978.
M. Lapp, M. C. Drake, C. M. Penney, R. So, and S. Warshaw. 25 Jan 79, 53p
Contract ET-78-C-03-1900

The goal of this research effort is to advance combustion design capability through development and validation of modeling techniques for turbulent diffusion flames, based upon the use of new experimental data to be obtained from non-intrusive optical measurement techniques. During this first reporting period, the following major efforts have been accomplished: (a) completion of the basic design and initiation of construction of a new fan-induced, square-cross-section combustion tunnel; (b) analysis of Raman scattering measurements using multiple-spectral-channel (MSC) detectors, calculation of light economy for spectrometer/MSC-detector system for use in pulsed Raman scattering observations, and measurement of MSC-detector sensitivity for commercially-available unit; and (c) development of formalism for model of hydrogen/air turbulent diffusion flame. (ERA citation 04:049010)

21C. Electric Propulsion

N79-31343/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Sputtering in Mercury Ion Thrusters.
M. A. Mantenieks, and V. K. Rawlin. 1979, 20p NASA-CR-162169, E-181
Conf-Presented at 14th Intern. Conf. On Electric Propulsion, Princeton, N. J., 31 Oct. - 2 Nov. 1979; Sponsored by AIAA and Deutsche Gesselschaft Fur Luft-und Raumfahrt.

A model, which assumes that chemisorption is the dominant mechanism, is applied to the sputtering rate measurements of the screen grid of a 30 cm thruster in the presence of nitrogen. The model utilizes inputs from a variety of experimental and analytical sources. The model of environmental effects on sputtering was applied to thruster conditions of low discharge voltage and a discussion of the comparison of theory and experiment is presented.

21D. Fuels

BETC-001-1 PC **A04**/MF **A01**
Oklahoma State Univ., Stillwater. Dept. of Chemistry.
Characterization of High Boiling Fossil Fuel Distillates Via exp 1 H and exp 13 C NMR Analysis. Quarterly Report, July 1, 1978--September 30, 1978.
K. D. Berlin, D. J. O'Donnell, and S. Sigle. 1978, 53p
Contract EW-78-S-19-0001

The progress to date under the orginal contract centers around the acquisition and analyses of exp 1 H and exp 13 C NMR spectra of the monoaromatic concentrates and GPC (gel permeation chromatography) fractions of Wilmington 209-76 No. 15, 19, 23 and Gach Saran 206-76 No. 14, 18, 22 distillates (535 to 675 exp 0 C). In addition, the analyses of diaromatic GPC fractions from Wilmington 211-76 No. 19 and Gach Saran 207-76 No. 21 distillates (535 to 675 exp 0 C) have also been initiated. The completion of these objectives has been slowed somewhat by additional requests by DOE for immediate analyses of fractions isolated from recovered lubricating oils. The results of the investigation of these lubricating oil fractions have also been included in this report, though not strictly a part of the original contract. (ERA citation 04:049482)

CONF-790415-28 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Ultrafine Structure of Coal Determined by Electron Microscopy.
L. A. Harris, and C. S. Yust. 1979, 8p
Contract W-7405-ENG-26
177. ACS national meeting, Honolulu, HI, USA, 1 Apr 1979.

The shape and size of pores in two high volatile bituminous coals of differing lithotypes have been directly observed by means of transmission electron microscope (TEM). The distribution of the porosity with respect to their maceral associations were ascertained as were the sizes and distributions of the micro minerals. The use of stereo pairs reveals the interconnectivity of the pores in micro volumes of the macerals indicating a high degree of permeability within those regions. The finest porosity was observed in vitrinite fragments of both coals and ranged in size from under 2 nm to 20 nm in diameter, with the majority in the smaller end of the size range. On the other hand, inertinite appears to be the most porous maceral and typically contains a broad range of pores from 5 through 30 nm. Much of the inertinite is granular material varying from fine to coarse grained particles with the former corresponding to micrinite. Finally, the least porous maceral is exinite which generally appears as a featureless material except for the presence of irregular and tubular pores thought to be initiated by the catalytic action of minerals. The intimate relationship between exinite and inertinite such as exists in durains, where the inertinite contains large amounts of fine mineral matter, may therefore promote the generation of porosity in exinites. (ERA citation 04:035586)

CONF-790520-5 PC **A02**/MF **A01**
Department of Energy, Washington, DC.
Ethanol/Gasoline Blends as Automotive Fuels.
J. R. Allsup, and D. B. Eccleston. 1979, 13p
International alcohol fuels technology, Asilomar, CA, USA, 28 May 1979.

An experimental study of gasoline and 10% ethanol/90% gasoline blends was made using five late-model vehicles operated on a climate-controlled chasis dynamometer. Data were obtained to permit comparisons of fuel economy, emissions, and other significant operational characteristics observed in tests with the two fuels. Volumetric fuel economy was shown to be slightly decreased while energy economy was slightly increased using the ethanol/gasoline blend. Compared with the results using base gasoline, the use of the ethanol/gasoline blend had no adverse effect upon regulated emissions at test temperatures within the range 20 exp 0 to 75 exp 0 F; at 100 exp 0 F there were mirror increases in emissions using the ethanol/gasoline blends. Addition of ethanol at 10% concentration generally either had no effect or only slight effect on unburned hydrocarbon; an exception was noted for 100 exp 0 F at which temperaure unburned hydrocarbon from the blend was increased significantly over that found with the base fuel. Road octane quality of the ethanol/gasoline blend was increased by about 3.5 numbers over the base fuel. (ERA citation 04:048882)

COO-4382-1 PC **A04**/MF **A01**
Pittsburgh Univ., PA. Dept. of Civil Engineering.

Preliminary Evaluation of the Use of Powdered Coal as a Natural Gas Substitute for Sewage Sludge Incineration. Final Report, June 1--November 30, 1977.
R. D. Neufeld, P. Yodnane, and J. I. Abrams. Nov 77, 72p
Contract EY-77-C-02-4382

Data was collected from each EPA region, each state environmental protection agency, and certain U.S. cities relative to oil, gas, and electricity usage for purposes of wastewater sludge incineration. At present, in the U.S., 7.2 x 10 exp 12 Btu of premium fuels are utilized for sludge incineration, 68% of which is from gas and 31.5% from oil. Major urban areas at present utilize 3.5 x 10 exp 12 Btu/yr of these fuels of which 99.5% is from natural gas. By considering sludge incinerators planned and under construction, it may be expected that by 1980, about 9.1 x 10 exp 12 Btu of premium fuels will be used for this purpose. If ocean dumping and landfilling of sludge were prohibited, and all major urban areas were to utilize sludge incineration, about 32 x 10 exp 12 Btu (or 159,000 heating equivalents) of premium fuels would be used for this purpose. Coal may be utilized to replace the premium fuels used for sludge incineration. Powdered coal may be utilized in biological reactors as nucleation sites for bio-floc development resulting in enhanced biological processing efficiency, while the resulting coal--biological sludge mixture may be sent to the sludge incinerator. Powdered coal usage at levels dictated by bio-reactor requirements indicate that the possibility exists to recover surplus coal--sludge generated energy from incineration and that 60 x 10 exp 12 Btu of premium fuel would be up for public use. The total social impact of this incinerator is about 450,000 home heating equivalents of energy, about 77.5% of which is located in major urban areas. (ERA citation 04:050284)

DOE/CS-0093 PC **A04**/MF **A01**
Department of Energy, Washington, DC. Office of Conservation and Solar Applications.
Project Planning Document: Highway Vehicle Alternative Fuels Utilization Program (AFUP).
Jul 79, 66p

This Project Planning Document for the Department of Energy (DOE) Alternative Fuels Utilization Program (AFUP) was developed to provide specific criteria and guidelines for the evaluation and development of nonpetroleum-based highway-vehicle fuels derived from domestic resources. The operative portion of the document is organized in terms of the five basic classes of alternative fuels currently identifiable. Within each class, general areas of R and D that must be addressed are illustrated in terms of a matrix format, while specific project relationships are identified by a corresponding flow chart. It should be emphasized that projects described in this document may well be grouped together and executed within one specific contract. Conversely, broad implications of other projects may well cut across and be integrated into a variety of contracts. Also included in this Project Plan is an overview of the evaluation of and relationships between these several alternative-fuels classes intended to progress toward a uniform and independent domestic highway transportation system. In addition, the mechanism for implementation of the AFUP is outlined. (ERA citation 04:048883)

DOE/CS-0095 PC **A06**/MF **A01**
Department of Energy, Washington, DC. Office of Building and Community Systems.
Environmental Assessment: Urban Waste Technology Program.
Jul 79, 108p

The environmental assessment (EA) of the Urban Waste Technology Program has been prepared in accordance with the applicable Department of Energy (DOE) Regulations for compliance with NEPA, and was carried out in awareness of the Council on Environmental Quality Regulations for NEPA implementation. This document analyzes the environmental impacts of DOE's Urban Waste Technology Program authorized by Congress as part of the Department of Energy Act of 1978 and relates to demonstration facilities for producing desirable forms of energy, including synthetic fuels, from urban waste. The major technologies within the Urban Waste Technology Program have been assessed in accordance with the current state of knowledge of each, as of the publication date of this report, to provide input of environmental considerations into the program decision making process. (ERA citation 04:050285)

DOE/PE-0012 PC **A07**/MF **A01**
Department of Energy, Washington, DC.
Report of the Alcohol Fuels Policy Review.
Jun 79, 129p

Four chapters and subchapter titles are: Alcohol Fuels Potential (Alcohol Potential for Petroleum Savings, Current Federal Incentives, Demand for Gasohol); Alcohol Fuels Policy Issues (Food Versus Fuel, Raw Material Supplies, Alcohol Production Economics, Small-Scale Operations, Net Energy Balance, Oil Replacement Value, Environmental Impacts); Policy Initiatives (Strategy and Recent Actions in Support of Alcohol Fuels); Additional Policies and Actions (Extended Excise Tax Exemption, etc.). Additional information in 4 appendices presented is current status of alcohol fuels, raw material availability and economics, alcohol production technologies and economics, and potential applications of alcohol fuels. (ERA citation 04:048259)

DOE/RL/90476-13 PC **A04**/MF **A01**
Oregon State Univ., Corvallis.
Investigation of the Viability and Cost Effectiveness of Solid Fuel Gasifiers Close Coupled to Internal Combustion Engines for 200 KWe Power Generation. Technical Progress Report No. 9.
J. G. Mingle, and D. C. Junge. Jan 79, 53p RLO-2227-T22-13
Contract EY-76-S-06-2227-022

The viability and cost effectiveness of a 200 kWe engine generator unit fueled by a direct coupled, solid fuel gasifier were studied. Recent literature describing gasifier technology was obtained and personal visits were made to test facility sites and engine manufacturing plants to discuss the subject with researchers and engineers. Two prototype units were inspected, one of which was in partial operation. This report presents a brief discussion of fuel and gasifier technology, gas treatment (clean up) for engine use, engine use technology, other uses for gasifiers, the viability of close coupled units, and an estimate of cost effectiveness. Present small experimental gasifier systems perform as expected and have served to demonstrate the technology. Typically they operate with fuel species which are present and collected on the site of a processing plant. Certain needed development efforts are discussed. Also, fuel must be available at low cost and even then electric power produced in this way is unlikely to be competitive economically where utility poles are available. (ERA citation 04:048043)

DOE/TIC-10308 PC **A07**/MF **A01**
Williams Companies, Tulsa, OK.
Study of Future U.S. Requirements for Propane and Butanes Through 1980.
16 Jun 77, 148p

Demand for LP gas, propane and butanes, in United States is forecast to increase moderately through 1980. Demand volumes are expected to rise from 988 thousand bbl/d during 1976 to 1,235 thousand bbl/d in 1980. Residential and commercial users consumed 53% of total propane volumes during 1976, and the increase in consumption is forecast to be moderate. The largest demand increases are expected to occur with industrial users and as petrochemical feedstocks. Industrial propane volumes are projected to expand from 63 thousand bbl/d during 1976 to 105 thousand bbl/d in 1980. Chemical propane volumes are expected to grow from 125 thousand to 200 thousand bbl/d during that time span, which would be near the peak volume of 1972 and 1973. The South and Southwest are projected to increase consumption of LP gas from 345 thousand bbl/d during 1976 to 455 by 1980, which reflects the petrochemical production within that area. Total supplies from U.S. sources are expected to decline. LP gas refinery production should increase, but not enough to offset expected decreases from U.S. gas plant production. Imports of LP gas from Canada are forecast to remain approximately static near the current levels. Overseas imports would provide volumes to satisfy unfilled market demands. (ERA citation 04:049495)

DOE/TIC-10486 PC **A14**/MF **A01**
Department of Energy, Washington, DC.
Report to the President: Financing an Alaska Natural Gas Transportation System.
1 Jul 77, 318p

The principal conclusion of this report is that there is good reason to anticipate that an economically viable system to transport natural gas from Alaska to the lower 48 states can be privately financed - that is, without Federal financing assistance. A private financing, however, will be difficult, if not impossible, to arrange without prior resolution of a number of issues. The most important issues that must be resolved before any financing can be arranged include: the mechanism by which the wellhead price for gas is determined; the method by which gas will be priced to the ultimate consumer; the authorization of a sufficient flow of gas by the State of Alaska; negotiation of sales contracts between gas producers and gas transmission companies; a determination of the allowable rate of return; formation of a final consortium of equity investors in the project; and determination of the extent to which benefiting parties (including the producers of the gas, the State of Alaska, and gas consumers) will provide financing support to the project. (ERA citation 04:048145)

DOE/TIC-10532 PC **A02**/MF **A01**
Federal Energy Administration, Washington, DC.
Economic Impact Evaluation of the Proposed Amendments to the Entitlements Program for Implementing Purchase Authority for the Strategic Petroleum Reserve.
Feb 77, 14p

The proposed amendments establish a specific method for financing oil acquisitions for the Reserve which, through the entitlements mechanism, allocates part of the costs of acquisitions to refiners and their customers, and the remainder of the costs presumably to general revenues. The proposed method of financing is probably superior to a benchmark case of only general taxation in the current period. Additionally, it disributes some of the costs through time until the expiration of controls in May 1979. The determination of who should bear the costs of the oil for the Strategic Petroleum Reserve is a political decision. However, the entitlements program's use places an uncertain portion of the cost burden on refiners and their customers due to the instability of its yield (the amount of cost reduction to the government) and its uncertainty of existence over a long period of time. (ERA citation 04:048127)

DOE/TIC-10820 PC **A06**/MF **A01**
Federal Energy Administration, Washington, DC.
Proposed Gasoline and Diesel Fuel Rationing Contingency Plan: Environmental Impact Assessment. Contingency Plan No. 7.
Apr 77, 113p

The Federal Energy Administration contingency plan for gasoline and diesel fuel rationing as required by Title II of the Energy Policy and Conservation Act of 1975 is described. This plan would be implemented only in a severe emergency resulting from a serious disruption of oil supplies, such as in a new petroleum import embargo. FEA prepared this environmental assessment for the proposed contingency plan for gasoline and diesel fuel rationing. Impacts identified with the proposed rationing plan are physical environment impacts, economic impacts, and social/quality of life impacts. (ERA citation 04:045900)

FE-2229-10-T1 PC **A04**/MF **A01**
Kentucky Univ., Lexington.
Surface Structure and Mechanisms of Gasification Catalyst Deactivation. Quarterly Report, May 1--July 31, 1978.
P. J. Reucroft, E. B. Bradley, R. J. DeAngelis, and G. A. Sargent. Nov 78, 74p
Contract EX-76-C-01-2229

Laser spectral studies of the adsorption of CO, O sub 2 , H sub 2 and D sub 2 on Ni(111) are discussed in relation to graphitic adlayers and Ni sur-

face states. No definite conclusion is made on which of these mechanisms would produce the dispersion in delta nu observed with variation in excitation frequency. The adsorption cell which will be used during infrared reflection studies of adsorbed gases on Ni(111) is described. Criteria for its design indicate that the infrared cell should maximize spectral response while minimizing scattering losses. Further reduction experiments have been carried out to study the sintering behavior of catalyst C150-1-01. Data showing the effects of sintering temperature and times of sintering on the particle size distribution functions by x-ray line broadening analysis are presented and discussed. An upgrading of the capabilities of the ESCA spectrometer is described. A series of Cr compounds (Cr, Cr sub 2 O sub 3 , Cr(OH)/sub x/, Cr sub 2 S sub 3 , and Cr sub 2 (SO sub 4) sub 3) have been examined. Analysis of the sulfided Ni--Cr/MgSiO sub 3 catalysts has continued. A simple model of the Ni/Al sub 2 O sub 3 catalyst is proposed. Auger electron spectroscopy has been used to obtain adsorption isotherms for CO on a S poisoned Ni(111) single crystal surface. The anomalous behavior of the isotherm obtained at about 100 exp 0 C as compared to those obtained at both lower and higher temperatures, together with desorption data, was interpreted as showing that CO dissociates on the surface to form C and O. (ERA citation 04:049436)

FE-2537-9 PC **A02**/MF **A01**
Oklahoma State Univ., Stillwater. Dept. of Chemistry.
Characterization of Coal-Derived Liquids and Other Fossil Fuel Related Materials Employing Mass Spectrometry. Quarterly Report, September 29--December 29, 1978.
S. E. Scheppele. 29 Jan 79, 19p
Contract EX-76-S-01-2537

The standard electron multiplier of the CEC 21-110B mass spectrometer was replaced with a Hamamatsu electron multiplier. The change allowed the electron multiplier to be operated at a higher gain with about the same noise level on the output signal as with the standard electron multiplier operating at lower gains. The dynamic resolution of the mass spectrometer was determined when the static resolution was set for a value of 13,000. Field-ionization mass spectra, FI/MS, were obtained for the following saturate fractions: Arco Shale Concentrates, 200-325 exp 0 C, 325-425 exp 0 C, and 425 exp 0 C+; South Swan Hills Concentrate 370-535 exp 0 C; and Utah Crude Oil No. 72054. The molecular ion intensities in the FI/MS of each sample were converted into carbon number distributions as a function of Z(H). The weight percents across each Z(H) series were summed to obtain total weight percents as a function of saturate type. Steps in completing the interfacing of the Nova 3/12 data acquisition system to the comparator-microdensitometer have been taken. An outline of the steps which have been completed and those which will be completed to implement the interfacing is given. Also preliminary designs are given in this report for the interface circuitry and the interface software. High- and low-resolution field-ionization mass spectral data were acquired for 19 monoaromatic, diaromatic, and polyaromatic polar concentrations. These samples were analyzed for the Separations and Characterization Group at the Bartlesville Energy Technology Center. Also acquisition of high-resolution field-ionization mass spectral data for the remaining asphaltene fractions from the COED coal liquid was completed. (ERA citation 04:049457)

FE-3240-T1 PC **A02**/MF **A01**
SRI International, Menlo Park, CA.
Shift Conversion and Methanation in Coal Gasification: Bench Scale Evaluation of a Sulfur Resistant Catalyst. Quarterly Progress Report, October 1--December 31, 1978.
J. G. McCarty, D. Meeker, and H. Wise. 10 Feb 79, 25p
Contract ET-78-C-01-3240

For the deactivation studies parallel integral reactors are being built. Different catalysts are given identical pretreatment and exposed to identical feed gas flow rates, gas compositions, and reaction conditions. The degree of CO consumption and CH sub 4 production is determined by measuring the composition of the effluent from each reactor. Relative resistance of the catalysts to poisoning is found by comparing the time required for a given degree of deactivation (e.g., 50% activity loss). Also the thermocouple array in each reactor records the movement of the reactive zone as the catalyst bed is poisoned. From data provided by the temperature profile versus time curve and the methane yield versus time curve we should be able to model the poisoning process in each catalyst bed. The integral reactor system is now being constructed. A sketch of the tube reactors is given. The schematic diagram of the integral reactor system also depicts the Berty reactor system. Both systems use the same analytical instruments and procedures. (ERA citation 04:049441)

N79-31405/0 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Comparison of the Properties of Some Synthetic Crudes with Petroleum Crudes.
A. C. Antoine. Jul 79, 31p NASA-TM-79220, E-115

Physical properties and chemical compositions of six synthetic crudes were determined. The results were compared to those of typical petroleum crudes, with the interest being the feasibility of making jet fuels from oil shale and coal syncrudes. The specific gravity, viscosity, and pour point were measured, showing that these crudes would be described as heavier rather than lighter crudes. The boiling range distribution of the crudes was determined by distillation and by gas chromatography. In addition, gel permeation chromatograms were obtained, giving a unique molecular weight distribution profile for each crude. Analyses for carbon, hydrogen, nitrogen and sulfur concentrations were performed, as well as for hydrocarbon group type and trace element concentrations. It was found that the range in concentration of vanadium, an element whose presence in turbine fuels is of major concern, was lower than that of petroleum crudes. Sodium and potassium, other elements of concern, were present in comparatively high concentrations.

PNL-2133 PC **A09**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Assessment of the Risk of Transporting Gasoline by Truck.
Nov 78, 190p
Contract EY-76-C-06-1830

Based on shipping assumptions and the current accident rate of 2.5 x 10 exp -6 per mile, it is estimated that gasoline tank trucks will be involved in 1,781 accidents in 1980, and that 110 of the accidents (about one in 15) will result in a release of 3,000 gallons of gasoline or more from the tank truck. About one in four of the releases are expected to result in a large fire. The estimated number of fatalities from the gasoline releases in 1980 is 29, with 12 of these fatalities being drivers of gasoline tank trucks, and the other 17 being occupants of other vehicles involved in the accident. Fatalities of other members of the public were found to occur infrequently. An additional 26 persons are expected to be fatally injured from the accident forces, regardless of the hazardous nature of the cargo. These total fatality figures (55) were compared to the prediction of 43 deaths of the Bureau of Motor Carrier Safety. (ERA citation 04:048131)

RLO-1053-T1 PC **A11**/MF **A01**
Durham, Anderson, Freed/HDR, Seattle, WA.
Tacoma Refuse Fired Combustor Study for the City of Tacoma, Washington.
R. R. Bell. Mar 78, 232p
Contract EC-77-C-06-1053

The purpose of this study was to examine the feasibility of using refuse-derived fuel and other waste fuels to fire a central energy plant to meet the heating and cooling needs of the Central Business District of Tacoma, with the possibility of marketing steam and/or electricity as a by-product. The study entailed examination of: the existing conditions; site selection; area waste availability; steam and hot water demands; the technical, environmental, and economic aspects of such a heating plant; conceptual design; overall feasibility studies; and financing, implementation and operation plans. It was the conclusion of the Tacoma Refuse Fired Combustor Study that an agreement be negotiated with the St. Regis Paper Company, Lumber and Plywood Division to furnish steam to the district heating system. If this cannot be accomplished, the construction of a central energy plant burning waste-type fuels is technically viable, but economic feasibility is dependent upon supplementing the central business district (CBD) heating load with the industrial steam load of the St. Regis Company. If equitable negotiations cannot be completed with St. Regis and the City of Tacoma, the CBD heating load would be served more cost effectively with individual electric boilers. (ERA citation 04:050460)

SAN-0115-T1 PC **A05**/MF **A01**
SRI International, Menlo Park, CA.
Mission Analysis for the Federal Fuels from Biomass Program. Volume III. Feedstock Availability. Final Report.
R. K. Ernest, R. H. Hamilton, N. S. Borgeson, F. A. Schooley, and R. L. Dickenson. Jan 79, 79p
Contract EY-76-C-03-0115-131

The biomass supply in the United States was estimated as a function of delivered price through the year 2020. The biomass supply represents the combined tonnages of agricultural, logging, and mill residues; other forest residues; and energy crop output. Two scenarios were used for the projections: a base case and an optimistic case reflecting increases in land and water availability for production of energy crops resulting from an array of government incentives. An appendix tabulates the feedstock availability by region, type, price, year, and scenario. (ERA citation 04:048305)

SAND-79-0637 PC **A12**/MF **A01**
Sandia Labs., Albuquerque, NM.
Systems Integration and Engineering Support Sudy for the Strategic Petroleum Reserve (SPR) Program. Final Report.
J. F. Ney, and H. M. Stoller. Jun 79, 272p
Contract EY-76-C-04-0789

A short-term systems integration and engineering support study was undertaken for the Strategic Petroleum Reserve (SPR) program. Objectives of the study were to: assess and evaluate the assumptions and criteria upon which the SPR program was established; identify potential technical problem areas; recommend R and D programs to address identified technical problems; assess the capabilities of the Early Storage Reserve (ESR) system; assess the capabilities of the proposed SPR system; and provide preliminary recommendations on systems engineering management needed to accomplish program objectives. This report describes the study effort and provides conclusions and recommendations in each area. (ERA citation 04:048134)

SERI/TP-35-279 PC **A02**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Rough Cost Estimates of Solar Thermal/Coal or Biomass-Derived Fuels.
R. J. Copeland. 1979, 8p CONF-790811-5
Contract EG-77-C-01-4042
AIAA terrestrial energy systems conference, Orlando, FL, USA, 4 Jun 1979.

The production of a synthetic fuel from a solar thermal resource could provide a means of replacing critical liquid and gaseous fossil fuels. The solar thermal resource is large and economics favors a southwestern site. A synthetic fuel would provide a desirable product and a means of transporting solar thermal energy to large load centers outside the southwest. This paper presents cost data for one method of producing synthetic methane. A hybrid approach was chosen, a combination of solar thermal and either coal or biomass. The magnitude of the solar thermal resource is estimated as well as projected cost. Cost projections for coal and biomass are accumulated. The cost of synthetic gas from a hybrid and a conventional fuel source are compared. (ERA citation 04:046089)

TID-28551 PC **A05**/MF **A01**
California Univ., Davis. Dept. of Agricultural Engineering.
Technological and Economic Assessment of the Utilization of Rice Straw Residue from the California Sacramento Valley for on-Farm Power Generation.
B. Horsfield, and R. O. Williams. Aug 76, 95p

Agricultural residues are an alternative source of energy because (1) they are renewable, (2) they are a result of current production technologies, and (3) they exist in rather large quantities. This report deals with a specific crop residue, rice straw, grown in a particular area, the California Sacramento Valley. This area of California can produce approximately 2 million tons of straw which has enough energy to provide 30% of the fuel requirements for a 1000 megawatt plant. Currently this rice straw is burned after each harvest season, resulting in objectionable air pollution. Alternative uses for rice straw are examined in order to put energy use in perspective. Conversion processes are also discussed with a major emphasis placed on gasification. Methods of harvest, collection and storage are discussed and the economics developed for several methods including total harvest. On-farm utilization of the energy content of rice straw is discussed, including rice drying and irrigation pumping. Off-farm use is also covered. (ERA citation 04:049654)

21E. Jet and Gas Turbine Engines

AD-A074 046/4 PC **A02**/MF **A01**
Advisory Group for Aerospace Research and Development Neuilly-sur-Seine (France)
Technical Evaluation Report of the Specialists' Meeting on Characterization of Low Cycle High Temperature Fatigue by the Strainrange Partitioning Method.
Advisory rept.,
J. M. Drapier, and M. H. Hirschberg. Jul 79, 15p
Rept no. AGARD-AR-130
See also Rept. no. AGARD-CP-243.

This Technical Evaluation Report of the Specialists' Meeting analyzes the present state of understanding of the method of Strainrange Partitioning for analysis and prediction of low-cycle high-temperature fatigue life. Recommendations for future activities which would be appropriate and valuable in this expanding area of life prediction are also included. Together with the Conference Proceedings, AGARD CP-243 published in August 1978, it represents a major contribution to this technology which is of vital concern to the NATO nations. This Advisory Report was sponsored by the Structures and Materials Panel of AGARD.

AD-A074 098/5 PC **A04**/MF **A01**
Kentucky Univ Lexington Dept of Engineering Mechanics
Thermo-Mechanical Stress Analysis of Advanced Turbine Blade Cooling Configuration.
Final rept. 1 May 75-15 Jul 79,
F. J. Rizzo, and D. J. Shippy. Jul 79, 67p UKY-TR111-79-EM17, AFOSR-TR-79-0953
Grant AFOSR-75-2824

A thermo-mechanical stress analysis capability, based on the Boundary Integral Equation Method (BIE) is developed and described. The capability is used to provide a thermoelastic analysis of stress in the vicinity of cooling holes in turbojet blades with transpiration or film cooling. Details involved in the formulation, numerical procedures, mathematical modelling, and data from solved problems are presented. (Author)

AD-A074 187/6 PC **A04**/MF **A01**
Naval Postgraduate School Monterey CA
An Adaptation and Validation of a Primitive Variable Mathematical Model for Predicting the Flows in Turbojet Test Cells and Solid Fuel Ramjets.
Master's thesis,
Charles Albert Stevenson. Jun 79, 75p

An adaptation of a primitive variable, finite-difference computer program was accomplished in order to predict the non-reacting flow fields in turbojet test cells and the reacting flow fields in solid fuel ramjets. The study compares the predictions of the primitive variable computer model with an earlier computer model and empirical data. It was found that the new model reasonably predicted the flow fields in both geometries. In addition, the primitive variable model allowed simulation of test cell flows up to full engine throttle conditions and solid fuel ramjet flows which included an aft mixing chamber. (Author)

AD-A074 233/8 PC **A04**/MF **A01**
Air Force Flight Dynamics Lab Wright-Patterson AFB OH
The Analysis of Sound Propagation in Jet Engine Ducts Using the Finite Difference Method.
Interim rept. Nov 75-Nov 78,
Dennis W. Quinn. Jun 79, 60p Rept no. AFFDL-TR-79-3063

In this report, the author derives the partial differential equations which describe sound propagation in jet engine ducts and then presents a finite difference approach for solving these equations. Also included is a computer program listing, sample input and sample output. The program can handle uniform rectangular and cylindrical ducts with or without uniform flow. In addition, if a mapping function which maps a nonuniform duct to a uniform duct is specified, the program can determine sound fields in nonuniform ducts in the absence of flow. (Author)

COO-2749-39 PC **A04**/MF **A01**
Chrysler Corp., Detroit, MI.
Baseline Gas Turbine Development Program. Twenty-Third Combined Quarterly Progress Report, May 1, 1978--January 31, 1979.
R. C. Pampreen, and C. E. Wagner. 31 Dec 78, 62p
Contract EY-76-C-02-2749

Progress is reported for a program whose goals are to demonstrate an experimental Upgraded gas turbine-powered automobile which meets the 1978 Federal Emissions Standards, has significantly improved fuel economy, and is competitive in performance, reliability, and potential manufacturing cost with the conventional piston engine-powered, compact-size American automobile. This is the concluding progress report for this program; it covers the period from May 1, 1978 to January 31, 1979. The next formal report will be the final report, which is currently in process. Activity during this reporting period has continued to emphasize development towards correcting a power deficiency in the Upgraded Engine. Efforts are also being directed towards reducing fuel usage through improved heat recovery and towards improving the mechanical reliability and control of the engine. (ERA citation 04:050287)

N79-31206/2 PC **A03**/MF **A01**
National Aeronautics and Space Administration, Washington, DC.
Investigation of Air Stream from Combustor-Liner Air Entry Holes, 3.
T. Aiba, and T. Nakano. Aug 79, 37p NASA-TM-75430, NAL-TR-369
Contract NASW-3198
Tran-Transl. Into English of "Ko Fuka Nenshoki No Kukiko Kara No Nagare Ni Tsuite, 3" Natl. Aerospace Lab., Tokyo, Nal-TR-369, 1974 23 p. Misc-Original Language Document Was Announced as N75-17358. Subm-Transl. By Scientific Translations Service, Santa Barbara, Calif.

Jets flowing from air entry holes of the combustor liner of a gas turbine were investigated. Cold air was supplied through the air entry holes into the primary hot gas flows. The mass flow of the primary hot gas and issuing jets was measured, and the behavior of the air jets was studied by the measurement of the temperature distribution of the gas mixture. The air jets flowing from three circular air entry holes, single streamwise long holes, and two opposing circular holes, parallel to the primary flow were studied along with the effects of jet and gas stream velocities, and of gas temperature. The discharge coefficient, the maximum penetration of the jets, the jet flow path, the mixing of the jets, and temperature distribution across the jets were investigated. Empirical expressions which describe the characteristics of the jets under the conditions of the experiments were formulated.

N79-31208/8 PC **A04**/MF **A01**
Pratt and Whitney Aircraft, East Hartford, CT. Commercial Products Div.
JT9D-70/59 Improved High Pressure Turbine Active Clearance Control System.
W. O. Gaffin. 8 Jun 79, 66p NASA-CR-159661, PWA-5515-87C
Contract NAS8-20630

The JT9D-70/59 high pressure turbine active clearance control system was modified to provide reduction of blade tip clearance when the system is activated during cruise operation. The modification increased the flow capacity and air impingement effectiveness of the cooling air manifold to augment turbine case shrinkage capability, and increased responsiveness of the airseal clearance to case shrinkage. The simulated altitude engine testing indicated a significant improvement in specific fuel consumption with the modified system. A 1000 cycle engine endurance test showed no unusual wear or performance deterioration effects on the engine or the clearance control system. Rig tests indicated that the air impingement and seal support configurations used in the engine tests are near optimum.

N79-31212/0 PC **A10**/MF **A01**
United Technologies Corp., East Hartford, CT.
Aerodynamic and Acoustic Investigation of Inverted Velocity Profile Coannular Exhaust Nozzle Models and Development of Aerodynamic and Acoustic Prediction Procedures.
Final Report.
R. S. Larson, D. P. Nelson, and B. S. Stevens.
Aug 79, 223p NASA-CR-3168, PWA-5550-8
Contract NAS3-20061

Five co-annular nozzle models, covering a systematic variation of nozzle geometry, were tested statically over a range of exhaust conditions including inverted velocity profile (IVP) (fan to primary stream velocity ratio 1) and non IVP profiles. Fan nozzle pressure ratio (FNPR) was varied from 1.3 to 4.1 at primary nozzle pressure ratios (PNPR) of 1.53 and 2.0. Fan stream temperatures of 700 K (1260 deg R) and 1089 K(1960 deg R) were tested with primary stream temperatures of 700 K (1260 deg R), 811 K (1460 deg R), and 1089 K (1960 deg R). At fan and primary stream velocities of 610 and 427 m/sec (2000 and 1400 ft/sec), respectively, increasing fan radius ratio from 0.69 to 0.83 reduced peak perceived noise level (PNL) 3 dB, and an increase in primary radius ratio from 0 to 0.81 (fan radius ratio constant at 0.83) reduced peak PNL an additional 1.0 dB. There were no noise reductions at a fan stream velocity of 853 m/sec (2800 ft/sec). Increasing fan radius ratio from 0.69 to 0.83 reduced nozzle thrust coefficient 1.2 to 1.5% at a PNPR of 1.53, and 1.7 to 2.0% at a PNPR of 2.0. The developed acoustic prediction procedure collapsed the existing data with standard deviation varying from + or - 8 dB to + or - 7 dB. The aerodynamic performance prediction procedure collapsed thrust coefficient measurements to within + or - .004 at a FNPR of 4.0 and a PNPR of 2.0.

N79-31213/8 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Aerodynamic Performance of 1.38-Pressure-Ratio, Variable-Pitch Fan Stage.
R. D. Moore, and W. M. Osborn. Sep 79, 71p NASA-TP-1502, E-9700

The performance of a variable pitch fan stage tested over a range of blade setting angles, speeds, and flows is presented. The fan was designed for a tip speed of 289.6 m/sec and a flow of 29.6 kg/sec. The measured performance agreed reasonably well with the design point. The stall margin was only 5 percent. Static thrust values along an operating line ranged from less than 15 to over 115 percent of that at design angle as the blade setting angle was varied from 25 degrees (closed) to -8 degrees (opened). The use of casing treatment increased the stall margin to 20.6 percent but decreased efficiency by 4 percentage points.

N79-31214/6 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
Aerodynamic Performance of Axial-Flow Fan Stage Operated at Nine Inlet Guide Vane Angles.
R. D. Moore, and L. Reid. Sep 79, 43p NASA-TP-1510, E-9714

The overall performance of a fan stage with nine inlet guide vane angle settings is presented. These data were obtained over the stable flow range at speeds from 60 to 120 percent of design for vane setting angles from -25 to 42.5 degrees. At design speed and design inlet guide vane angle, the stage

has a peak efficiency of 0.892 at a pressure ratio of 1.322 and a flow of 25.31 kg/s. The stall margin based on peak efficiency and stall was 20 percent. Based on an operating line passing through the peak efficiency point at the design setting angle, the useful operating range of the stage at design speed is limited by stall at the positive setting angles and by choke at the negative angles. At design the calculated static thrust along the operating line varied from 68 to 114 percent of that obtained at design setting angle.

N79-31215/3 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Conceptual Study of a Turbojet/Ramjet Inlet.
J. P. Weidner. Sep 79, 25p NASA-TM-80141, L-13036

An inlet concept for separate turbojet and ramjet engines was defined and compared with an equivalent inlet for a wraparound turboramjet engine. The comparison was made for a typical high altitude hypersonic cruise vehicle where the turbojet inlet capture area was required to be half as large as the ramjet inlet capture area at cruise. The use of a shorter nacelle having substantially lower cooling requirements at cruise for the inlet concept for separate turbojet and ramjet engines is suggested. The separate engine concept better isolates the turbojet from the ramjet, requires no special close off mechanisms within the turbojet, and avoids the circumferential heat load imposed by a wraparound ramjet. A more variable geometry is required.

N79-31348/2 PC **A07**/MF **A01**
General Electric Co., Cincinnati, OH. Aircraft Engine Group.
Containment of Composite Fan Blades.
Final Report.
C. L. Stotler, and A. P. Coppa. Jul 79, 144p NASA-CR-159544, R79AEG197
Contract NAS3-20118

A lightweight containment was developed for turbofan engine fan blades. Subscale ballistic-type tests were first run on a number of concepts. The most promising configuration was selected and further evaluated by larger scale tests in a rotating test rig. Weight savings made possible by the use of this new containment system were determined and extrapolated to a CF6-size engine. An analytical technique was also developed to predict the released blades motion when involved in the blade/casing interaction process. Initial checkout of this procedure was accomplished using several of the tests run during the program.

N79-32129/5 PC **A06**/MF **A01**
Detroit Diesel Allison, Indianapolis, IN.
Single Shaft Automotive Gas Turbine Engine Characterization Test.
Final Report.
R. A. Johnson. Sep 79, 103p NASA-CR-159654, DDA-EDR-9790
Contracts DEN3-4, EC-77-A-31-1040
Subm-Prepared for NASA and DOE.

An automotive gas turbine incorporating a single stage centrifugal compressor and a single stage radial inflow turbine is described. Among the engine's features is the use of wide range variable geometry at the inlet guide vanes, the compressor diffuser vanes, and the turbine inlet vanes to achieve improved part load fuel economy. The engine was tested to determine its performance in both the variable geometry and equivalent fixed geometry modes. Testing was conducted without the originally designed recuperator. Test results were compared with the predicted performance of the nonrecuperative engine based on existing component rig test maps. Agreement between test results and the computer model was achieved.

PAT-APPL-6-051 315 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Combined Cycle Ramjet Engine.
Patent Application,
John R. Smith. Filed 22 Jun 79, 14p AD-D006 308/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The metallic wall of the combustion chamber of a combined rocket-ramjet engine is lined with solid ramjet fuel overlaid with rocket fuel. After the consumption of the rocket fuel in the boost portion of the flight the solid ramjet fuel burns and ablates protecing the metallic combustion chamber wall from high temperatures during the cruise of the missile flight. (Author)

PATENT-4 163 629 Not available NTIS
Department of the Air Force Washington DC
Turbine Vane Construction.
Patent,
Edward C. McDonough, and Eugene N. Tuley.
Filed 23 Dec 77, patented 7 Aug 79, 4p AD-D006 315/6, PAT-APPL-864 049
Supersedes PAT-APPL-864 049-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent describes a variable area turbine vane, for use in high temperature aircraft gas turbines, having a load carrying spar with a heat shield member surrounding the load carrying member. The heat shield member is positioned in grooves which permit spanwise and cordwise expansion of the heat shield member. Cooling air enters the hollow load bearing member and passes through holes in the load bearing member and heat shield member. (Author)

21G. Reciprocating Engines

ANL/CNSV-TM-9 PC **A03**/MF **A01**
Argonne National Lab., IL.
Analysis of Likely Economic Effects of Commercialization of Alternative Automobile Engines.
L. G. Hill, T. L. McNeil, D. J. Santini, and E. J. Stenehjem. Sep 78, 49p
Contract W-31-109-ENG-38

This study provides an analysis of the likely economic impacts resulting from the introduction of alternative engines for automobiles. To ensure that indirect economic effects were included, the impact analysis system, TECNET, and additional computations were employed. A moderate economic growth scenario was developed as a framework for the economic analysis. Primary impacts were found in fuel and materials input sectors. Smelting of ferroalloy ores, nonferroalloy ores, and fuel refining were found to be primary effects. Mining, transport, and capital financing were identified as secondary impacts. This study does not treat all alternative engine configurations and does not examine the value of the multi-fuel capabilities of the specified alternative engines. The results of this study indicate that additional research on these subjects is desirable. (ERA citation 04:050288)

COO-2764-T3 PC **A04**/MF **A01**
Mechanical Technology, Inc., Latham, NY.
Free-Piston Stirling Engine Demonstrator Test Plan.
15 Dec 78, 52p
Contract EY-76-C-02-2764

Mechanical Technology Incorporated is developing a 1 KWe Free-Piston Stirling ENgine (FPSE) Power System. The plan for testing the demonstrator power system is presented. The test hardware is a Free-Piston Stirling Engine prime mover driving a linear alternator. The demonstrator system is basically a modular assembly. The modules are the reciprocating alternator section, engine section, heater head insulation package assembly, and the pressure vessel. The test objective is to demonstrate a system with greater than 30% overall efficiency at 1 KW, 45 hz operating conditions, and to identify and isolate engine losses to provide a basis for future engine improvements. (ERA citation 04:048519)

COO-4396-3 PC **A06**/MF **A01**
Ford Motor Co., Dearborn, MI.
Automotive Stirling Engine Development Program. Quarterly Technical Progress Report, April 1978--June 1978.
1978, 101p NASA-CR-159436
Contract EC-77-C-02-4396

The report covers the third quarter (April--June, 1978) effort of the Ford/DOE Automotive Stirling Engine Development Program, specifically Task I of that effort which is Fuel Economy Assessment. At the end of the previous quarter (March 31, 1978) the total fourth generation fuel economy projection was 23.7 mpg with a confidence level of 40%. At the end of this quarter (June 30, 1978) the tctal fourth generation fuel economy projection was 26.12 mpg with a confidence level of 44%. This represents an improvement of 66.4% over the baseline M-H fuel economy of 15.7 mpg. The confidence level for the original 20.6 mpg goal has been increased from 53 to 57%. Engine 3X17 has now accumulated a total of 213 h of variable speed running. A summary of the individual sub-tasks of Task I is presented. The sub-tasks are grouped into two categories: Category 1 consists of those sub-tasks which are directly related to fuel economy and Category 2 consists of those sub-tasks which are not directly related to fuel economy but are an integral part of the Task I effort. (ERA citation 04:048877)

DOE/NASA/1040-79/6 PC **A04**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Low-Power Baseline Test Results for the GPU 3 Stirling Engine.
L. G. Thieme. Apr 79, 66p NASA-TM-79103
Contract EC-77-A-31-1040

In support of the Department of Energy's Stirling Engine Highway Vehicle Systems Program, the NASA Lewis Research Center has converted a 7.5-kilowatt (10-hp) Stirling engine to a research configuration in order to obtain data for validating Stirling-cycle computer simulations. The engine was originally built by General Motors Research Laboratories for the US Army in 1965 as part of a 3-kW engine-generator set that was designated the GPU 3 (Ground Power Unit 3). Baseline tests were run to map the engine over a range of heater-tube gas temperatures, mean compression-space pressures, and engine speeds with both helium and hydrogen as the working fluid. Tests were limited to the lower power levels because the original alternator and a resistance load bank were used and they were not capable of absorbing the full engine output power. Test results show that engine output and engine efficiency increased with increasing pressure level. However, the relative gain in power and, particularly, the relative gain in efficiency decreased as pressure increased. The maximum efficiency for a given pressure level was obtained at intermediate speeds. Flow losses caused the efficiency to decrease at high speeds, and conduction losses caused it to decrease at low speeds. The hydrogen power curves were more linear with speed than were the corresponding helium curves - an indication of the lower flow losses associated with hydrogen. The maximum power obtained with hydrogen was 4.48 kW (6.0 hp) at 4.1 megapascals (600 psi) mean compression-space pressure; the maximum power output with helium was 3.92 kW (5.25 hp) at 6.9 megapascals. (ERA citation 04:050289)

DOE/NASA/1040-79/7 PC **A02**/MF **A01**
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Stirling Engines for Automobiles.
D. G. Beremand. 1979, 15p NASA-TM-79222
Contract EC-77-A-31-1040

The automobile is one of the most difficult of engine applications, combining the requirements for low cost mass production with those for high efficiency, low emissions, extensive low part power operation and fast response. The ability of the Stirling engine to meet these requirements utilizing existing and near term technology is assessed. In this assessment the results of recent and ongoing automobile Stirling engine development efforts (Ford Motor Company, MTI/USS/AMG, and others) are reviewed and technology status and requirements are identified. Key technology needs include those for low cost, high temperature (1300 to 1500 exp 0 F) metal alloys for heater heads, and reliable long-life, low-leakage shaft seals. Various fuel economy projections for Stirling powered automobiles are reviewed and assessed. It is concluded that a 50 to 60% fuel economy (mpg) im-

provement over a conventional spark ignition engine powered automobile is within the development range of existing and near term technology. (ERA citation 04:050290)

N79-31210/4 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
An Overview of NASA Research on Positive Displacement Type General Aviation Engines.
E. E. Kempke, and E. A. Willis. 1979, 40p NASA-TM-79254, E-165
Conf-Presented at the Aircraft Systems and Technol. Meeting N. Y., 20-22 Aug. 1979; Sponsored by AIAA.

The general aviation positive displacement engine program encompassing conventional, lightweight diesel, and rotary combustion engines is described. Lean operation of current production type spark ignition engines and advanced alternative engine concepts are emphasized.

PATENT-4 100 742 Not available NTIS
Department of the Army Washington DC
Turbocompound Engine with Turbocharger Control.
Patent,
James L. Harp, Jr. Filed 9 Dec 76, patented 18 Jul 78, 5p AD-D006 320/6, PAT-APPL-748 975
Supersedes PAT-APPL-748 975-76.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent relates to an exhaust energy extraction system for a multi-cylinder engine, comprising an axial flow turbine arranged to convert time-spaced exhaust pressure pulses into turbine rotor rotation. Output flow from the axial flow turbine is directed through a diffuser that converts velocity pressure to static pressure; a second radial flow turbine is operated by the steady state flow produced by the diffuser. Any tendency of the diffuser to exert an adverse back pressure on the axial flow turbine is counteracted by a pressure-responsive vent valve that establishes a ceiling on the diffuser pressure. (Author)

21H. Rocket Motors and Engines

N79-31341/7 PC **A07**/MF **A01**
Sundstrand Corp., Rockford, IL.
Liquid Oxygen/Liquid Hydrogen Boost/Vane Pump for the Advanced Orbit Transfer Vehicles Auxiliary Propulsion System.
F. Gluzek, R. G. Mokadam, I. H. To, J. D. Stanitz, and J. Wollschlager. Sep 79, 138p NASA-CR-159648
Contract NAS3-20401

A rotating, positive displacement vane pump with an integral boost stage was designed to pump saturated liquid oxygen and liquid hydrogen for auxiliary propulsion system of orbit transfer vehicle. This unit is designed to ingest 10% vapor by volume, contamination free liquid oxygen and liquid hydrogen. The final pump configuration and the predicted performance are included.

N79-31342/5 PC **A11**/MF **A01**
Aerojet Liquid Rocket Co., Sacramento, CA.
Dual-Fuel, Dual-Throat Engine Preliminary Analysis.
Final Report.
C. J. Obrien. Aug 79, 235p NASA-CR-161304, REPT-32967F
Contract NAS8-32967

A propulsion system analysis of the dual fuel, dual throat engine for launch vehicle applications was conducted. Basic dual throat engine characterization data were obtained to allow vehicle optimization studies to be conducted. A preliminary baseline engine system was defined.

PATENT-4 149 404 Not available NTIS
Department of the Army Washington DC
Pressure Testing of Rocket Motor Cases.
Patent,
Niles C. White. Filed 24 May 78, patented 17 Apr 79, 4p AD-D006 353/7, PAT-APPL-909 071
Supersedes PAT-APPL-909 071-78.
Availability: This Government-owned invention available for U.S. Licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The patent describes a method for pressure testing a rocket motor case by inserting a movable piston in the nozzle end of the rocket motor case, sealing the piston relative to the throat of the rocket motor case, and then applying pressure to the rocket motor case to pressure test the rocket motor case to a predetermined pressure or to failure. (Author)

21I. Rocket Propellants

PATENT-4 126 441 Not available NTIS
Department of the Army Washington DC
Solubility of NPGA in a Polyurethane Binder.
Patent,
Marjorie T. Cucksee, and Henry C. Allen. Filed 1 Dec 77, patented 5 Dec 78, 6p AD-D006 333/9, PAT-APPL-856 437
Supersedes PAT-APPL-856 437-77.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method of mixing poly(neopentylglycol)azelate (NPGA) is disclosed which enhances its solubility in polyurethane binders for composite solid propellants. The method comprises withholding the addition of NPGA from the propellant submix and from the total propellant formulation mixing procedure until after the addition of the curing agent has taken place and reaction has taken place for a predetermined period of time with the bonding agent until a 'break' in viscosity occurs. The 'break' in viscosity has taken place when the other binder ingredients have reacted with the curing agent HDI (hexamethylenediisocyanate) so that immiscibility between the binder ingredients is reduced. The late NPGA addition method resulted not only in apparently complete solubilization of the NPGA but also yielded a propellant with dramatically lower end of mix viscosity (reduced by a factor of 10), superior flow characteristics, and better physical properties. Propellants made by the disclosed method of mixing have desirable lower modulus and higher tensile strength. Thus, the propellant mixed in accordance with the late NPGA addition method yields a propellant with a high tensile strength to modulus ratio. The high tensile strength to modulus ratio at low temperature is an indicator of a good propellant. (Author)

PATENT-4 132 740 Not available NTIS
Department of the Army Washington DC
Preparation of Carboranyl Sulfides.
Patent,
Royland D. Shoults. Filed 3 Oct 72, patented 2 Jan 79, 4p AD-D006 336/2, PAT-APPL-293 257
Supersedes PAT-APPL-293 257-72.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Carboranylmethyl alkyl sulfides are disclosed along with a process for preparation which process involves reacting with the propargyl alkyl sulfide in cyclohexane. (Author)

PATENT-4 133 706 Not available NTIS
Department of the Army Washington DC
Propellants Containing Carboranylmethyl Alkyl Sulfide Plasticizers.
Patent,
Royland D. Shoults. Filed 3 Oct 72, patented 9 Jan 79, 6p AD-D006 338/8, PAT-APPL-293 256
Supersedes PAT-APPL-293 256-72.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Carboranylmethyl alkyl sulfides are disclosed along with propellant compositions which employ the sulfides as plasticizers. The propellant compositions using the carboranylmethyl alkyl sulfides yield high burning rates and possess good physical properties at high and low temperatures. Processability of the propellants are good and the quality of the propellants are quite attractive. Representative of the carboranylmethyl alkyl sulfides (CB plasticizers) are carboranylmethyl ethyl sulfide (CMES), carboranylmethyl n-propyl sulfide (CMPS), carboranylmethyl n-butyl sulfide (CMBS), carboranylmethyl iso-butyl sulfide (CMIBS), and carboranylmethyl iso-propyl sulfide (CMIPS). Mixture and eutectic mixtures of the carboranylmethyl alkyl sulfides are also employed. Eutectic mixtures of CMPS and CMES (20 to 80%) yield very low-melting-point plasticizers which are very attractive for propellants subjected to low temperature environments. (Author)

PATENT-4 150 057 Not available NTIS
Department of the Army Washington DC
Method for Preparation of a Carboranyl Burning Rate Accelerator Precursor.
Patent,
David C. Sayles. Filed 29 Mar 78, patented 17 Apr 79, 7p AD-D006 359/4, PAT-APPL-891 253
Supersedes PAT-APPL-891 253-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Disclosed is a method of synthesis and the compound synthesized B10H12(CH3)2S)2. The method employs the starting compound (R4N)2B10H10, as a source of the ten-boron ion (e.g., B10H10-2), in which the starting compound, wherein R equals an alkyl with the formula C(n)H(2n + 1) and wherein n equals 2, 3, or 4, is converted to Li2B10H10 by ion-exchange. The Li2B10H10 is reacted with HCl in (CH3)2S solution to produce the compounds B10H12((CH3)2S)2, a precursor compound for synthesizing carboranyl burning rate accelerators. The precursor compound is reacted with propargyl propionate if the interest is to synthesize carboranylmenthyl propionate; 1-octyne to synthesize n-hexylcarborane; or propargyl ethyl sulfide or propargyl propyl sulfide to synthesize carboranylmethyl ethyl sulfide or carboranylmethyl propyl sulfide, respectively. (Author)

PATENT-4 154 633 Not available NTIS
Department of the Army Washington DC
Method for Making Solid Propellant Compositions having a Soluble Oxidizer.
Patent,
Everette M. Pierce. Filed 14 Apr 78, patented 15 May 79, 3p AD-D006 373/5, PAT-APPL-896 271
Supersedes PAT-APPL-896 271-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An oxidizer that is soluble in a polar solvent selected from ethanol, diethyl ether, and acetone is used in a propellant composition mixing procedure to effect an improved dispersion of the oxidizer. The soluble oxidizer is selected from the reaction products formed by reacting together an equivalent amount of a first reactant selected from triethanol amine or diethanol amine with an equivalent amount of a second reactant perchloric acid when the soluble perclorate salt is desired for use. The soluble oxidizer is selected from the reaction products formed by reacting together an equivalent amount of a first reactant selected from triethanol amine or diethanol amine with an equivalent amount of a second reactant nitric acid when the soluble nitrate salt is desired for use. The dissolved oxidizer is added to the binder portion of the propellant during mixing. After being widely dispersed, the soluble oxidizer and binder portion are mixed under low vacuum and mild heat (e.g., 110 F. to 120 F.) to remove the polar solvent thereby leaving the oxidizer in a widely dispersed state. The other propellant ingredients are added and mixing is continued to achieve homogenity prior to forming and curing the propellant for its intended use. The propellant composition with the widely dispersed oxidizer shows improved burning rate. (Author)

22. SPACE TECHNOLOGY

22A. Astronautics

AD-A073 842/7 PC **A02**/MF **A01**
Foreign Technology Div Wright-Patterson AFB OH
Disturbance Caused by the Fall of a Satellite,
Ch'u Hsieh. 2 Feb 79, 15p Rept no. FTD-ID(RS)T-2336-78
Edited trans. of Hang K'ung Chih Shih (China) n5 p8-10 1978, by H. P. Lee.

No abstract available.

N79-31238/5 PC **A08**/MF **A01**
British Aerospace Dynamics Group, Bristol (England). Electronics and Space Systems.
Spacelab Follow-on Mission Support Study. Volume 1: Summary.
Final Report.
R. Henderson, and A. Vickery. Oct 78, 157p ESS/SS-901-V-1, ESA-CR(P)-1183-V-1
Contract ESA-3566/78-F-HEW(SC)
Seri-6. Subm-Prepared in Cooperation with Dornier-Werke G.M.B.H., Friedrichshafen, (Germany, F.R.).

Engineering support given to ESA in the task of assembling model Spacelab payloads suitable for the demonstration mission is described in a six volume report. Three payload models (with options) were assembled. These include: (1) a microgravity mission for life science radiation experiments, space technology, and for scanning astrophysics experimentation; (2) an earth oriented mission for earth observation and atmospheric physics experimentation; and (3) an astrophysics experimental instrument array. Volume one summarizes the study results for each of the payloads in both engineering and cost sharing indexes terms.

N79-31239/3 PC **A07**/MF **A01**
British Aerospace Dynamics Group, Bristol (England). Electronics and Space Systems.
Spacelab Follow-on Mission Support Study. Volume 2: Payload DM1.
Final Report.
R. Henderson, J. R. Davis, G. Biddis, P. Gillett, and J. Howard. Oct 78, 140p ESS/SS-901-V-2, ESA-CR(P)-1183-V-2
Contract ESA-3566/78-F-HEW(SC)
Seri-6. Subm-Prepared in Cooperation with Dornier-Werke G.M.B.H., Friedrichshafen, (Germany, F.R.).

Engineering support given to ESA in the task of assembling model Specelab payloads suitable for the demonstration mission series is described in a six volume report. This volume describes a Spacelab mission designed to exploit the low gravity mode of operation in the early European Utilization Program. The prime disciplines to be given a flight opportunity are the material and life sciences. The factor to be exploited is the longer duration available for experimentation. Crystal growth studies as well as crew physiology, sled experiments, biology experiments, particularly plant and animal experiments, will be undertaken. The resources available for such a configuration are summarized and experimental design is discussed in detail.

N79-31240/1 PC **A07**/MF **A01**
British Aerospace Dynamics Group, Bristol (England). Electronic and Space Systems.
Spacelab Follow-on Mission Support Study. Volume 3: Payload DM2.
Final Report.
E. Achtermann, K. L. Bitzer, W. Gilg, W. Kriegl, and O. Neff. Oct 78, 131p ESS/SS-901-V-3, ESA-CR(P)-1183-V-3
Contract ESA-3566/78-F-HEW(SC)
Seri-6. Subm-Prepared in Cooperation with Dornier-Werke G.M.B.H., Friedrichshafen, (Germany, F.R.).

Engineering support given to ESA in the task of assembling model Spacelab payloads suitable for the demonstration mission series is described in a six volume report. This volume describes a Spacelab payload composed of 35 experiments for atmospheric, solar, and earth observation investigations. Besides the structural accomodation, the power and energy compatibility with Spacelab is analyzed. The payload in the proposed form seems to be adapted, with several constraints, to the Spacelab capability.

N79-31241/9 PC **A07**/MF **A01**
British Aerospace Dynamics Group, Bristol (England). Electronics and Space Systems.
Spacelab Follow-on Mission Support Study. Volume 4: Payload D4.
Final Report.
R. Henderson, J. Davis, G. Biddis, P. Gillett, and J. Howard. Oct 78, 150p ESS/SS-901-V-4, ESA-CR(P)-1183-V-4
Contract ESA-3566/78-F-HEW(SC)
Seri-6. Subm-Prepared in Cooperation with Dornier-Werke G.M.B.H., Friedrichshafen, (Germany, F.R.).

Engineering support given to ESA in the task of assembly model Spacelab payloads suitable for the demonstration mission series is described in a six volume report. This volume describes a Spacelab payload designed for a deep space pointing attitude with several astronomy objectives. Experiments involve infrared astronomy, extreme ultraviolet/ultraviolet astronomy, gamma ray astronomy, cosmic radiation, and high energy physics, as well as visual astronomy. A long duration mission (10 days) is envisaged.

N79-31242/7 PC **A09**/MF **A01**
British Aerospace Dynamics Group, Bristol (England). Electronics and Space Systems.
Spacelab Follow-on Mission Support Study. Volume 5: Cost Indices.
Final Report.
A. P. Vickery. Oct 78, 188p ESS/SS-901-V-5, ESA-CR(P)-1183-V-5
Contract ESA-3566/78-F-HEW(SC)
Seri-6. Subm-Prepared in Cooperation with Dornier-Werke G.M.B.H., Friedrichshafen, (Germany, F.R.).

The results and conclusions of the Cost Sharing Indexes (CSI) calculated during the course of the Spacelab follow-on mission support study, for the experiments that were being considered in the study, are presented. Assumptions on module/pallet configuration, number of energy kits, and mission duration had to be made for candidate experiments, calculating the effects on mass, volume, and energy consumption. Demonstration missions one and two are analyzed in detail showing the total national CSI for the payload listed in the included table, in terms of mass, energy and volume. German mission 4 (D4) is also analyzed.

N79-31243/5 PC **A10**/MF **A01**
Erno Raumfahrttechnik G.m.b.H., Bremen (Germany, F.R.). Main Dept. for Predevelopment and Studies.
System Study of Near-Term Spacelab Follow Alternatives. Volume 1: Technical Report.
Final Report.
P. Natenbruk, W. Wienss, H. Friedrich, and S. Ransom. Dec 78, 209p PRV-11/78-V-1, ESA-CR(P)-1211-V-1
Contract ESA-3565/78-F-HEW(SC)
Seri-2.

Individually defined Spacelab improvements related to the categories of increased electrical power and heat rejection for Spacelab payloads, extended mission durations beyond seven days, and improved operational flexibility and payload services are discussed. Design impact on system level is identified. Combined effects on operation and mission capability are described and implementation alternatives, schedules, and cost projections are established.

N79-31244/3 PC **A05**/MF **A01**
Erno Raumfahrttechnik G.m.b.H., Bremen (Germany, F.R.). Main Dept. For Predevelopment and Studies.
System Study of Near-Term Spacelab Follow-on Development Alternatives. Volume 2: Programmatic Considerations.
Final Report.
P. Natenbruk. Dec 78, 95p PRV-11/78-V-2, ESA-CR(P)-1211-V-2
Contract ESA-3565/78-F-HEW(SC)
Seri-2.

The programmatic assessment of improvement items including implementation assumptions and alternatives, costing of the improvement items to a total budget necessary for the SL-FOD first step, and a summary of the technical and programmatic results and recommendations for a subsequent effort are presented.

N79-31245/0 PC **A18**/MF **A01**
British Aerospace Dynamics Group, Bristol (England). Electronics and Space Systems.
Spacelab Follow-on Mission Support Study. Volume 6: Rider.
Final Report.
R. Henderson, J. Davis, G. Biddis, P. Gillett, and M. Biddell. Apr 79, 418p ESS/SS-901-V-6, ESA-CR(P)-1183-V-6
Contract ESA-3566/78-F-HEW(SC)
Subm-Prepared in Cooperation with Dornier-Werke G.M.B.H., Friedrichshafen, (Germany, F.R.).

The Spacelab demonstration mission series was studied and is described in a six volume report. The objective of the study was to provide engineering support to ESA in the task of assembling model Spacelab payloads which might be suitable for the demonstration mission series. Under direction from ESA, three payload models (with options) were assembled. In addition, the Cost Share Index for each experiment included in the options was calculated on the basis of resource utilization. A rider to the study was undertaken in October 1978 and completed in March 1979 to address specific problems which could not be resolved during the main study analysis; additionally, thermal requirements were addressed. New payload options using different Spacelab configurations were generated.

N79-31250/0 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, MD.
Launch Summary for 1978.
R. W. Vostreys. Aug 78, 42p NASA-TM-80503, NSSDC/WDC-A-R/S-79-04
Misc-Revised.

Sounding rocket, satellite, and space probe launchings are presented. Time, date, and location of the launches are provided. The sponsoring countries and the institutions responsible for the launch are listed.

N79-31253/4 PC **A04**/MF **A01**
British Aerospace Dynamics Group, Bristol (England). Electronics and Space Systems.
Investigation of the Application of the BAC Counterspin Nutation Damper for ESA Satellites.
Final Report.
J. Simpson, and R. Arnett. Oct 77, 73p ESS/SS-837, ESA-CR(P)-1187
Contract ESA-2941/76-NL-AK(SC)

A theoretical analysis of damper performance is presented, showing the necessity for counterspinning the wheel. The existance of an optimum viscosity value when no spring enhancement is present, the existance of an optimum value for the spring constant when spring enhancement is present, the fact that the damper time constant can be made arbitrarily close to zero, and the Coulomb friction torques produced by residual undampable mutation are also shown. A detailed analog computer simulation was made which agrees with the optimum coefficients of spring and viscous torque. The application of the damper to a variety of spacecraft is considered, with emphasis on the system aspects of the implementation.

N79-31338/3 PC **A10**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands).
Study of Spacecraft Attitude Reconstitution Using the ESA Starmapper.
P. T. L. M. Vanwoerkom, C. R. Traas, A. L. Bleekrode, F. J. Sonnenschein, and H. Bokhove. 1978, 212p NLR-TR-77120-U, ESA-CR(P)-1192
Contract ESTEC-2383/75-AK
Subm-Prepared in Cooperation with Tech. Phys. Dienst TNO-TH.

A mathematical model of the rotational dynamics of a rigid, spinning spacecraft is formulated with asymmetry and external torques. A mathematical

model of the ESA starmapper is developed with optical-electronic and telemetry effects. A linear, recursive filter for the estimation of spacecraft attitude motion and system parameters is formulated with divergence detection and adaptation. A number of system parameters cannot yet be estimated accurately. Treating these as consider parameters improves the estimation of the spacecraft attitude motion. For small nutation angles, an estimation accuracy of about one arcminute can be achieved. For large nutation angles and large initial attitude errors the estimation process will, in general, diverge due to nonlinearity of the measurement equation. Divergence can be delayed or reduced if measurement noise is increased. A number of improvements related to the starmapper model, filter, and range of applications is suggested.

N79-31962/0 PC **A15**/MF **A01**
European Space Agency, Paris (France).
Spacecraft Onboard Data Management.
T. D. Guyenne. Dec 78, 338p SP-141
Conf-Presented at ESA/Eurospace Intern. Symp., Nice, France, 24-27 Oct. 1978.

No abstract available.

SAND-79-0411C PC **A02**/MF **A01**
Sandia Labs., Albuquerque, NM.
Aerodynamic Coefficient Estimation by Means of an Extended Kalman Filter.
J. R. Kelsey, and D. P. Petersen. 1979, 19p
CONF-790826-1
Contract EY-76-C-04-0789
Atmospheric flight mechanics conference, Boulder, CO, USA, 6 Aug 1979.

An extended, augmented Kalman filter is used to study several dynamic models of vehicle motion aimed at estimating the aerodynamic moment coefficients. These models consider various state representations as well as various measurement sets. Linear and cubic symmetric moments are considered as well as linear asymmetric moments. Computer generated data representative of a reentry vehicle flight are used as the simulated measurement information. Coefficient estimates and error estimates are given for each of the models studied. The computer time required for estimate convergence is also shown, indicating that near-real-time estimation is possible. (ERA citation 04:048980)

22B. Spacecraft

AD-A074 312/0 PC **A02**/MF **A01**
Aerospace Corp Los Angeles CA
Aerodynamic Heating on a Multi-Hundred Watt Heat Source Based on Wind Tunnel Tests.
Final rept.,
Mamoru Masaki. Jul 79, 20p AFWL-TR-78-160, AD-E200 359
Contract F04701-77-C-0078

The General Electric Space Division conducted aerodynamic heating tests of the multi-hundred watt heat source configuration of the NASA Mariner-Jupiter/Saturn spacecraft. Curve fit approximations of the data were obtained so that aerodynamic heating studies with any angle of attack history can be performed in a simple manner. Characteristics of theoretical and semi-empirical results for the type of configuration were utilized in obtaining the approximations due to some discrepancies in the data. (Author)

N79-31252/6 PC **A18**/MF **A01**
Office National d'Etudes et de Recherches Aerospatiales, Paris (France). Direction des Etudes de Synthese.
Etude Generale de l'Influence des Liquides Contenus dans les Satellites (A General Study of the Influence of Onboard Liquids on Satellite Behavior).
Final Report.
J. P. Guibert, H. T. Huynh, and J. L. Marce. Sep 78, 413p ONERA-RT-N-1/3307-SY, ESA-CR(P)-1166
Contract ESTEC-2720/76-NL-AK(SC)
Language in French.

Two general problems associated with the stabilization of spacecraft along three axes and relative to the presence of onboard liquids are studied. These are the determination of the localization of liquids in a reduced gravity environment, and the study of the dynamic coupling between the movements of the liquids and those of a satellite. Specific problems concerning the design of storage tanks (presence of a diaphragm) and the particular physical nature of the liquid used (cryogenic liquids) are also treated. Mathematical models for all phenomena discussed are presented. Liquid-vapor interfaces and equilibrium, capillary hysteresis of semiwetting liquids, and dynamic variations in contact angle are emphasized. The need for more powerful computer programs (three dimensional analysis with complex geometries) as well as a program of experimentation onboard Spacelab is noted.

N79-31255/9 PC **A08**/MF **A01**
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, TX.
Flight Design System Level C Requirements. Solid Rocket Booster and External Tank Impact Prediction Processors.
R. H. Seale. Aug 79, 165p NASA-TM-80520, JSC-16072

The prediction of the SRB and ET impact areas requires six separate processors. The SRB impact prediction processor computes the impact areas and related trajectory data for each SRB element. Output from this processor is stored on a secure file accessible by the SRB impact plot processor which generates the required plots. Similarly the ET RTLS impact prediction processor and the ET RTLS impact plot processor generates the ET impact footprints for return-to-launch-site (RTLS) profiles. The ET nominal/AOA/ATO impact prediction processor and the ET nominal/AOA/ATO impact plot processor generate the ET impact footprints for non-RTLS profiles. The SRB and ET impact processors compute the size and shape of the impact footprints by tabular lookup in a stored footprint dispersion data base. The location of each footprint is determined by simulating a reference trajectory and computing the reference impact point location. To insure consistency among all flight design system (FDS) users, much input required by these processors will be obtained from the FDS master data base.

N79-31257/5 PC **A03**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Optimum Repair Level Analysis (ORLA) for the Space Transportation System (STS).
W. R. Henry. Jul 79, 28p NASA-TM-78239

A repair level analysis method applied to a space shuttle scenario is presented. A determination of the most cost effective level of repair for reparable hardware, the location for the repair, and a system which will accrue minimum total support costs within operational and technical constraints over the system design are defined. The method includes cost equations for comparison of selected costs to completion for assumed repair alternates.

N79-31261/7 PC **A04**/MF **A01**
British Aerospace Dynamics Group, Bristol (England). Electronics and Space Systems.
A Follow-on Study of a Spin-Up and Ejection Mechanism (SUEM). Volume 1: Report Summary.
Final Report.
E. Crellin, M. Humphries, C. S. Rostron, and E. P. L. Windsor. Jul 78, 73p ESS/SS-910-V-1, ESA-CR(P)-1200-V-1
Contract ESA-3487/78-F-DK(SC)
Seri-2.

The work carried out during a follow-on study of a spin-up and ejection mechanism (SUEM) for Spacelab is described. The current study was aimed at achieving better low ejection velocity characteristics at the expense of the high velocity part of the spectrum and a reduction of development cost. This is achieved by the adoption of a spring actuation system which is combined with a redesigned clamp/release mechanism. A summary of the complete study is presented including development and cost aspects.

N79-31262/5 PC **A07**/MF **A01**
British Aerospace Dynamics Group, Bristol (England). Electronics and Space Systems.
A Follow-on Study of a Spin-Up and Ejection Mechanism (SUEM). Volume 2: Study Notes.
Final Report.
E. Crellin, M. Humphries, C. S. Rostron, and E. P. L. Windsor. Jul 78, 150p ESS/SS-910-V-2, ESA-CR(P)-1200-V-2
Contract ESA-3487/78-F-DK(SC)
Seri-2.

The ejection dynamics of SUEM are analyzed and a computer simulation is developed. The simulation is used to update the performance envelope of the ejection mechanism and to investigate the extension of the envelope down to an ejection velocity of 1/3 1/ms for a 50kg satellite.

N79-31265/8 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, OH.
NASCAP Modelling of Environmental-Charging-Induced Discharges in Satellites.
N. J. Stevens, and J. C. Roche. 1979, 25p
NASA-TM-79247, E-155
Conf-Presented at Ann. Conf. On Nucl. And Space Radiation Effects, Santa Cruz, Calif. 17-20 Jul. 1979; Sponsored by IEEE.

The charging and discharging characteristics of a typical geosynchronous satellite experiencing time-varying geomagnetic substorms, in sunlight, were studied utilizing the NASA Charging Analyzer Program (NASCAP). An electric field criteria of 150,000 volts/cm to initiate discharges and transfer of 67 percent of the stored charge was used based on ground test results. The substorm characteristics were arbitrarily chosen to evaluate effects of electron temperature and particle density (which is equivalent to current density). It was found that while there is a minimum electron temperature for discharges to occur, the rate of discharges is dependent on particle density and duration times of the encounter. Hence, it is important to define the temporal variations in the substorm environments.

N79-31266/6 PC **A99**/MF **A01**
European Space Agency, Paris (France).
Spacecraft Thermal and Environmental Control Systems.
M. Khine, and B. Battrick. Oct 78, 645p ESA-SP-139
Conf-Proc. Of Esa Intern. Symp., Munich, 10-12 Oct. 1978.

No abstract available.

N79-31339/1 PC **A04**/MF **A01**
Office National d'Etudes et de Recherches Aerospatiales, Leclerc (France). Direction des Etudes de Synthese.
Influence des Liquides Embarques sur la Stabilite du Vehicle Exosat Plus Quatrieme Etage d'Ariane en Orbite de Transfert (Influence of Onboard Liquids on the Stability of Exosat Plus the Ariane Fourth Stage During Transfer Orbit).
J. P. Guibert. Feb 79, 75p ONERA-RT-3/6107-SY, ESA-CP(P)-1207
Contract ESTEC-2720/76-NL-AK(SC)
Language in French.

During transfer orbit the vehicle comprised of EXOSAT and the ARIANE fourth stage is unstable due to rotation around the axis of least inertia. The principle cause of this divergence in the angular movement is directly related to the behavior of onboard liquids (two liquid propane tanks and a hydrazine tank with a diaphragm, representing approximately 4% of the total mass). For each type of tank the principle modes affecting the vehicle are modeled and the divergence time constant is evaluated. Results are used to formulate propositions for ground tests. One test involves a turning table for determining the sloshing frequency of the hydrazine tank while another employs gas bearing and is to be used for both the hydrazine and propane tanks.

N79-31340/9 PC **A02**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
The RIM Inertial Measuring System (RIMS).
N. J. Groom. Aug 79, 20p NASA-TM-80100

The rim inertial measuring system (RIMS) is introduced and an approach for extracting angular rate

and linear acceleration information from a RIMS unit is presented and discussed. The RIMS consists of one or more small annular momentum control devices (AMCDs), mounted in a strapped down configuration, which are used to measure angular rates and linear accelerations of a moving vehicle. An AMCD consists of a spinning rim, a set of noncontacting magnetic bearings for supporting the rim, and a noncontacting electromagnetic spin motor. The approach for extracting angular rate and linear acceleration information is for a single spacecraft mounted RIMS unit.

N79-31512/3 PC **A03**/MF **A01**
Allgemeine Elektricitaets-Gesellschaft, AEG-Telefunken, Wedel (Germany, F.R.). Abt. Raumfahrt-Elektronik.
Assessment of Short and Medium Term Improvements to the Spacelab Power System. Volume 1: Executive Summary.
26 Oct 78, 39p ESA-CR(P)-1193-V-1
Contract ESA-3538/78-F-HEW(SC)
Seri-2.

The results of a study for the improvement of Spacelab's baseline electrical power and distribution system (EPDS) are presented. Three technical areas are covered. These are improvement of baseline-EPDS hardware, the introduction of an additional power source for experiment power augmentation, and the replacement of the baseline EPDS 3 phase 400 Hz ac distribution system by a medium frequency (10 to 20 KHz) ac power distribution system. The improvements include a dc/ac inverter, an experiment power switching panel, a power control box, harness improvements, a medium frequency ac power system, dc/ac medium frequency inversion, and medium frequency ac power distribution, switching, and protection.

N79-31513/1 PC **A04**/MF **A01**
Allgemeine Elektricitaets-Gesellschaft, AEG-Telefunken, Wedel (Germany, F.R.). Abt. Raumfahrt-Elecktronik.
Assessment of Short and Medium Term Improvements to the Spacelab Power System.
26 Oct 78, 56p ESA-CR(P)-1193-V-2
Contract ESA-3538/78-F-HEW(SC)
Seri-2.

The results of a study to improve Spacelab's baseline electrical power and distribution system (EPDS) are presented. An additional 3 kW power source for experiment power augmentation is discussed, including the analysis of fuel cell kits as add-on power modules. A solar array subsystem, technical descriptions, and a cost/schedule assessments are also discussed.

N79-31519/8 PC **A05**/MF **A01**
Etudes Techniques et Constructions Aerospatiales, Charleroi (Belgium).
A Study of Advanced Power Supplies.
Final Report.
A. Poncin, and C. Rym. Jan 79, 81p LAB-79-22, ESA-CR(P)-1220
Contract ESTEC-3386/77-NL-HP(SC)

Different approaches to the problem of satellite power supply were studied from a modular systems point of view in order to define a new generation of flexible, low cost power supplies. As a secondary goal, an increase in the competitiveness of European industry in this field is intended. Four different satellite application payloads were reviewed and from their requirements various subsystem configurations are proposed. Areas where the maximum reuse of hardware can be achieved were also identified. Results comprise the definition of each configuration for each mission to modular level, a schematic for each modular type, and preliminary specifications for these modules.

N79-31635/2 PC **A13**/MF **A01**
Analytical and Computational Mathematics, Zurich (Switzerland).
Dynamics of a System of Two Satellites Connected by a Deployable and Extendible Tether of Finite Mass, Volume 1.
P. Kohler, W. Maag, and R. Wehrli. Oct 78, 297p ESA-CR(P)-1205-V-1
Contract ESTEC-2992/76-NL-AK(SC)
Seri-2.

Relative to the study of the dynamics of tethered satellites, an elementary derivation of the equations of motion is presented. Partial differential equations for the three dimensional shape of an extendible tether of variable length and mass were derived from application of Newton's second law and the equation for the rate of change of angular momentum, the two satellites (considered as point masses) yielding boundary conditions. The equations were transformed to variables which are suited for a finite difference approximation. The resulting algorithm, which was implemented in a digital simulation program, including important perturbations, some predetermined deployment laws, and a control law damping oscillations by means of variation of the tether length, is described in detail. Finally, the program description, the user's guide, and a discussion of sample runs are given.

N79-31636/0 PC **A06**/MF **A01**
Eidgenoessische Technische Hochschule, Zurich (Switzerland). Inst. fuer Mechanik.
Dynamics of a System of Two Satellites Connected by a Deployable and Extendible Tether of Finite Mass, Volume 2.
R. Weber, and H. Brauchli. Oct 78, 111p ESA-CR(P)-1205-V-2
Contract ESTEC-2992/76-NL-AK(SC)
Seri-2. Subm-Prepared for Anal. And Computational Math., Zurich.

The mechanical formulation of the full problem of tethered satellites is presented. The system considered consists of two satellites connected by an elastic tether of variable length. Partial differential equations are derived together with the boundary conditions based on two different methods, using first D'Alembert's variational principle for both the motion of the tether and the motion of the satellites resulting from the boundary conditions, and second Hamiston's principle for the whole system, yielding nonholonomic equations in the general cave. The finite element method and Ritz averaging method are given for the numerical approximation. As an appendix some simplified models, namely the spherical pendulum model, longitudinal and transversal oscillations, and a lumped mass model are presented. Applications to spacecraft stabilization are also outlined.

N79-77458/4 PC **A02**/MF **A01**
Lockheed Electronics Co., Inc., Houston, TX. Systems and Services Div.
Development of the SINDA Temperature Initialization Program (CPD 909).
Program documentation,
P. E. Fogerson, and D. Raznahan. Apr 79, 14p LEC-13264, NASA-CR-160184, JSC-14804
Contract NAS9-15800

This document describes a program which builds a steady state SINDA model from a transient model for the purpose of obtaining a set of initial temperatures for the correlation of predictions with test data. The new model converts to boundary nodes those diffusion and arithmetic nodes which correspond to measurement locations.

PAT-APPL-6-048 951 PC **A02**/MF **A01**
Department of the Air Force Washington DC
Propulsion Assist Stage for Geosynchronous Orbit Injection from Space Shuttle.
Patent Application,
F. R. Chiappetta. Filed 15 Jun 79, 24p AD-D006 304/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The patent application is concerned with a propulsion assist stage to be used in combination with a space shuttle in flight and with a payload to be launched into a low earth orbit from the space shuttle. The propulsion assist stage includes: a structural system that is mounted vertically within an openable cargo bay of the space shuttle; a solid propellant rocket motor that functions as the perigee kick (i.e., boost) motor and that is releasably connected to the lower end of the structural system; and a bi-propellant rocket engine that is mounted on the structural system at the upper end, encircling the solid propellant rocket motor, and that functions as the apogee kick motor. The payload is releasably attached to, and is positioned vertically on top of, the bi-propellant rocket engine. The payload-propulsion assist stage combination is spin launched, along a vertical axis, from the in-flight space shuttle; and, the perigee kick motor and the apogee kick motor are used to research the proper orbit, and then are individually and sequentially jettisoned, with the payload despinning, deploying, and centering the desired low earth orbit. (Author)

22C. Spacecraft Trajectories and Reentry

AD-A073 877/3 PC **A02**/MF **A01**
Naval Surface Weapons Center Dahlgren Lab VA
Comparison of C-Band Radar and Doppler Geoceiver Accuracies in Orbit Determination.
Final rept.,
Carol G. Branch. Nov 78, 22p Rept no. NSWC/DL-TR-3719

A study is made herein of the relative consistency of C-band and Doppler station navigations with respect to a Doppler-derived orbit. The procedure, results, error analyses, and accuracy criteria are included. It is concluded that C-band radar tracking data are not an adequate substitute for Doppler geoceiver data in computing orbits of satellites when precise altitudes are required for satellite altimeter applications. (Author)

AD-A073 975/5 PC **A03**/MF **A01**
Naval Surface Weapons Center Dahlgren Lab VA
Perturbations in Perigee and Eccentricity at the Critical Inclination.
Final rept.,
Claus Oesterwinter. Dec 78, 29p Rept no. NSWC/DL-TR-3724

A cluster of three satellites showed large, unpredicted orbital perturbations shortly after launch. There was immediate concern for the success of its mission which depends on the stability of the cluster geometry. The Naval Surface Weapons Center found the zonal harmonics of degree five and seven to cause most of the observed perturbations. Subsequently, the three orbits were computed for the time frame June 1976 to July 1984. It was also shown that the cluster configuration remains unaffected by the large orbital perturbations, and the mission appears safe. (Author)

AD-A074 231/2 PC **A03**/MF **A01**
Massachusetts Inst of Tech Lexington Lincoln Lab
Differential Orbit Correction for Near-Stationary Artificial Satellites.
Technical note,
Laurence G. Taff, and John M. Sorvari. 17 Jul 79, 35p TN-1979-38, ESD-TR-79-184
Contract F19628-78-C-0002

This report presents a new concept for the differential correction of orbits. It is developed in detail for near-stationary artificial satellites. For these satellites a few (< 10) observations over a short (5-15m, < or approx. = 1% period) time interval allows the reacquisition of the satellite an hour later. Moreover, with only slightly more data points (total number < 15) over a slightly longer (total duration < 0.5h) time interval it is capable of producing an excellent set of orbital elements. The technique is self-starting and does not use any of the classical initial orbit determination procedures. It can be used by a radar or extended to include angular velocity data. Its success appears to be based on the ability to find a coordinate system in which the object's motion is nearly stationary and the extensive use of analytical (instead of numerical) procedures. Extensions of the theory to include all first-order perturbations and to all orbital types are possible. (Author)

N79-31246/8 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Langley Research Center, Hampton, VA.
Orbit Design for Solar and Dual Satellite Occultation Measurements of Atmospheric Constituents.
D. R. Brooks, and E. F. Harrison. Jul 79, 56p NASA-TM-80137, AIAA-PAPER-79-101
Conf-Presented at the AAS/AIAA Astrodyn. Specialist Conf., Provincetown, Mass., 25-27 Jun. 1979.

Two types of satellite based occultation missions are considered for measuring atmospheric con-

stituents. Nominal cases for each type are presented to demonstrate representative solutions to orbit design problems. For the solar occultation mode, large areas of the globe can be covered during a one year mission, but the measurements are limited to local dawn or dusk. For the dual satellite mode, with a laser aboard a second satellite to act as a source, diurnal coverage can be obtained at the expense of more complex systems and mission scenarios. In this mode, orbit pairs are selected which maintain their relative orbit plane geometry while their differing periods drive cyclic patterns of latitude coverage. A simulated one year solar occultation mission is used to illustrate one way of analyzing occultation data by averaging measurements within bands of constant latitude.

N79-31254/2 PC **A04**/MF **A01**
National Aerospace Lab., Amsterdam (Netherlands). Scientific Services.
Processing of METEOSAT Attitude Measurement Flight Data and Evaluation of the Performance of an Adaptive Filtering Technique.
C. R. Traas, and G. Moek. 1978, 68p NLR-TR-78146-U, ESA-CR(P)-1218
Contract ESTEC-3319/77

The attitude measurement data of the ESA geosynchronous spacecraft METEOSAT were analyzed using an adaptive recursive filtering technique. The mathematical models of spacecraft dynamics and sensors were kept very simple. Modeling errors are such that, without adaptive feedback, strong divergence of the filtering process occurs. Is is shown that the adaptive process stabilizes the filtering considerably. Complete error consistency, however, could not be attained in the present case. The reasons for this are analyzed.

N79-32014/9 PC **A04**/MF **A01**
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, AL.
Computer Program Development and User's Manual for Program PARACH.
H. I. Murphree. Sep 79, 68p NASA-TM-78238

A user's manual is provided for program PARACH, a FORTRAN digital computer program operational on the Univac 1108. A description of the program and operating instructions for it are included. Program PARACH is used to study the interaction dynamics of a parachute and its payload during terminal descent. Operating instructions, required input data, program options and limitations, and output data are described. Subroutines used in this program are also listed and explained.

SAND-79-1365C PC **A02**/MF **A01**
Texas Univ. at Austin.
Analysis of Reentry Vehicle Trajectory Reconstruction and Parameter Identification.
J. L. McDowell, B. E. Schutz, and B. D. Tapley.
1979, 11p CONF-790826-2
Contract EY-76-C-04-0789
Atmospheric flight mechanics conference, Boulder, CO, USA, 6 Aug 1979.

An analysis has been made of a method for postflight reconstruction of reentry vehicle states and the identification of associated model parameters using the Trajectory Analysis Program (TRAP). The present investigation focuses on the extent to which a reduced order dynamical model can be utilized to reconstruct reentry vehicle trajectories and to estimate aerodynamic coefficients from onboard observations of the vehicle motion. The feature of local arc trajectory partitioning is disucssed and its application to the reentry vehicle problem is described. Numerical results derived from simulated measurements are presented which illustrate the feasibility of this approach. (ERA citation 04:050429)

22D. Spacecraft Launch Vehicles and Ground Support

N79-31249/2 PC **A07**/MF **A01**
Thomson-CSF, Meudon-la-Foret (France).
Study of the Definition of a Ground SAR Processor for SEASAT-A.
Final Report.
1978, 136p ESA-CR(P)-1199
Contract ESA-3350/77-NL-HP(SC)

A ground processor for the SEASAT A - synthetic aperture radar (SAR) is discussed. The solutions retained for the processing as well as the equipment performance specifications are given. Solutions, such as going from a high throughput rate to low throughput rates with intermediate high density data transmission buffering to bring down the input data rate were considered. All solutions are based on the use of parallel one bit processors which form the basic building block of the PROPAL II processor. Such an architecture was demonstrated to be able to adapt to varied processing requirements and, therefore, its flexibility and growth potential is important. The processor configuration retained was optimized for cost at the expense of throughput performance.

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